MERCED
2030

CITY OF MERCED

- HOW SHOULD WE GROW? -

MERCED 2030

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March 1990

MERCED 2030 - HOW SHOULD WE GROW?

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INTRODUCTION

A CITY FOR THE FUTURE

If future Merced is to be a liveable community with a satisfying physical environment, we must carefully plan for it today. Whether we like it or not, growth and change is coming to the San Joaquin Valley, including Merced. It is inevitable. The real question we must answer is: "How should Merced grow?", not "Whether Merced should grow?"

Unfortunately, many of our country's urban areas are characterized by chaotic and fragmented growth. This often creates an unpleasant living environment with major environmental impacts and a development pattern in which it is expensive for local government to provide public facilities and services. Ultimately, the taxpayer must pay higher taxes and fees, while not getting a better quality of life in return. There are certainly plenty of examples of this in California.

Merced has a great challenge ahead, but it also has a great opportunity to learn from the mistakes of other urban areas. In a sense, this report is about exploring the possibility of creating a future Merced lifestyle better than most Mercedians and Californians now experience. Whether we can turn this challenge into a reality is a matter of civic will. It is also critical for the City of Merced and Merced County to work cooperatively in this endeavor.

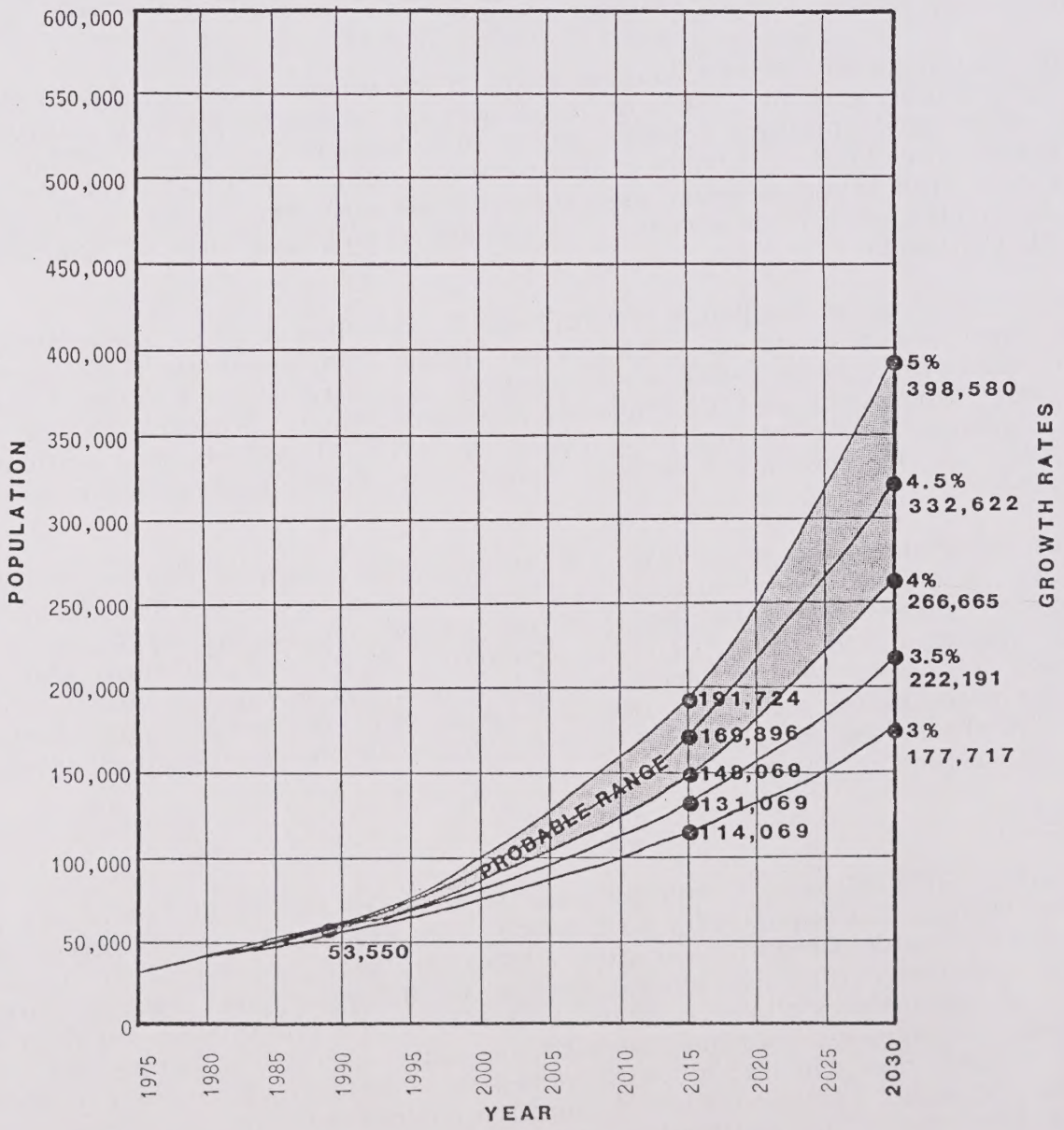
Imagine Merced in the year 2030, or 40 years from now. If present trends continue, it will have a population of 250,000 and cover a land area about five times our present size. During that time period, approximately 66,300 additional dwellings will have been constructed. There will be more shopping centers, industrial areas, parks, schools and neighborhoods, but trying to keep up with traffic jams, pollution and crime will be a much bigger challenge too. "What choices do we have?", and "What will Merced be like?"; that is what this report is all about.

PURPOSE

The Merced 2030 Growth Plan's purpose is to allow the City's residents and decision makers the opportunity to consider the advantages and disadvantages of various possible Growth Scenarios. After considering each of the possible Growth Scenarios, the City should decide on an appropriate growth pattern and adopt associated policies. Phase I of the study will involve considerable community discussion, culminating with the City Council selecting the preferred Growth Scenario and growth concepts. Phase II will involve adopting policies and other implementation measures to carry out the preferred future Growth Scenario. This will likely involve amending Merced's General Plan and Specific Urban Development Plan (SUDP) boundary.

MERCED IS GROWING

Merced currently has approximately 53,500 residents. The City has been experiencing a steady growth rate of 4% to 5% per year for the last 20 years, as indicated below. The City is expected to double in population by the year 2005 (15 years). At this current growth rate, Merced can expect to be a City of approximately 250,000 by the year 2030. The population projection graph was generated from 1989 population data by the City of Merced Planning Division. A simple geometric projection graph was developed to show a probable growth range of between 4% and 5%. There are currently no indications that the growth rate is going to change.



POPULATION PROJECTIONS WITH VARIABLE GROWTH RATES

FIGURE 1

Continual population growth is expected in California. The Central Valley is projected to receive much of this growth. Population growth is anticipated in Merced because more out-of-town businesses are considering Merced for expansion and relocation, our economic base and population are expanding, and people are migrating here from other states and California cities. (For example, some residents commute daily to and from San Jose jobs because of high Bay Area housing costs.) Some of the factors likely to contribute to Merced's continued population growth include:

1. Lack of traffic congestion.
2. Availability of industrial land.
3. Relatively low land and development costs.
4. Attractive affordable residential neighborhoods.
5. Abundance of trees and natural aesthetic resources.
6. The spillover effect from Bay Area residents who can no longer afford homes where they work.
7. Relatively low cost of labor and overhead.
8. Convenient central location in the Valley (for businesses and ease of travel).
9. Positive attitude of local government towards encouraging economic and population growth.
10. Good place to raise children.
11. Quality City facilities and services.
12. Close proximity of Yosemite National Park, the Gold Country, Monterey Peninsula, and San Francisco.

Additionally, Merced could become a bedroom community for Modesto and/or Fresno, as housing costs and traffic congestion increases in these larger cities. Placement of a U.C. Campus, major regional shopping center, or other large activity in Merced would attract additional growth. Finally, the availability of large, undeveloped blocks of land to the north, south, and east of the City may also encourage growth there due to the apparent ease of assembling such parcels for development.

Ironically, many of the positive factors attracting individuals and businesses to Merced could be lost due to growth impacts. Traffic congestion, crime, increased housing costs, smog, escalated land costs, sewerable land shortages, urban sprawl, and overall lower standards of living are often negative aspects of unplanned growth.

However, growth can be advantageous to a community such as Merced for many reasons. Growth brings increased job opportunities for citizens, a more

diversified and stable economy, greater social, cultural and educational opportunities, and opportunities for existing businesses to expand. Growth handled properly can minimize the possible negative impacts to residents. Long-term planning will make it possible for the City to provide future facilities and services efficiently.

PRESENT CITY GROWTH POLICIES

Merced has some very important physical growth constraints that will likely continue to limit the direction growth can take. The illustration below summarizes the present growth constraints, and the City/County agreed upon greenbelt. These constraints include prime agricultural lands to the east and west, flood-prone lands to the south, the Merced Airport clear zone in the southwest corner of the present City limits, Castle Air Force Base flight path to the northwest, and Lake Yosemite to the northeast. To date, the City has had strong City policies directing growth away from these sensitive areas.

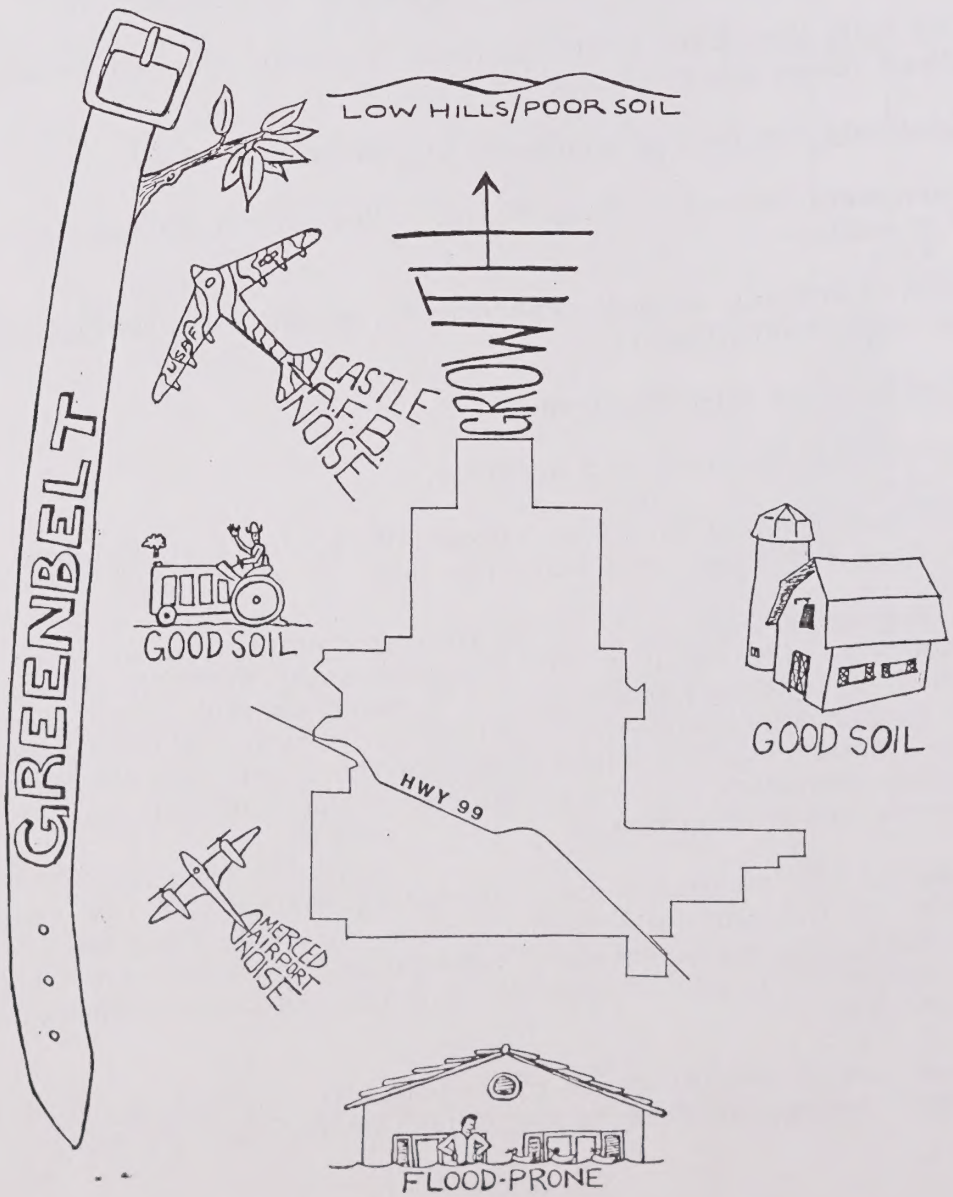


FIGURE 2

The Specific Urban Development Boundary is the City/County mutually agreed upon boundary for urban expansion within the City. No annexation proposals can be accepted by the City unless they are within this boundary.

Although the City has undertaken Merced 2030 - How Should We Grow?, it should be noted that quality development is expected to first be encouraged within the existing Specific Urban Development Plan (SUDP) boundary. This includes infill development consistent with the General Plan prior to expansion of the SUDP boundary. If our present rate of growth continues, the present SUDP has enough land until approximately 2005. (Approximately 5,000 acres are left undeveloped in the present SUDP, which should support a total population of 150,000 at 6 units/acre.)

Timing is an essential consideration of any growth policy. In order to avoid urban sprawl, the area within the SUDP should be developed and a certain population threshold reached before new commercial, industrial or residential construction is approved beyond the SUDP. If policies are too severe, however, development pressure may shift to the County. This could create undesirable pockets of County development within our growth area. The current SUDP boundary and city limits are shown below. The Downtown residential neighborhoods and businesses should remain a prominent and stable hub even with considerable growth. New growth, if properly managed, can enhance the downtown and central Merced areas.

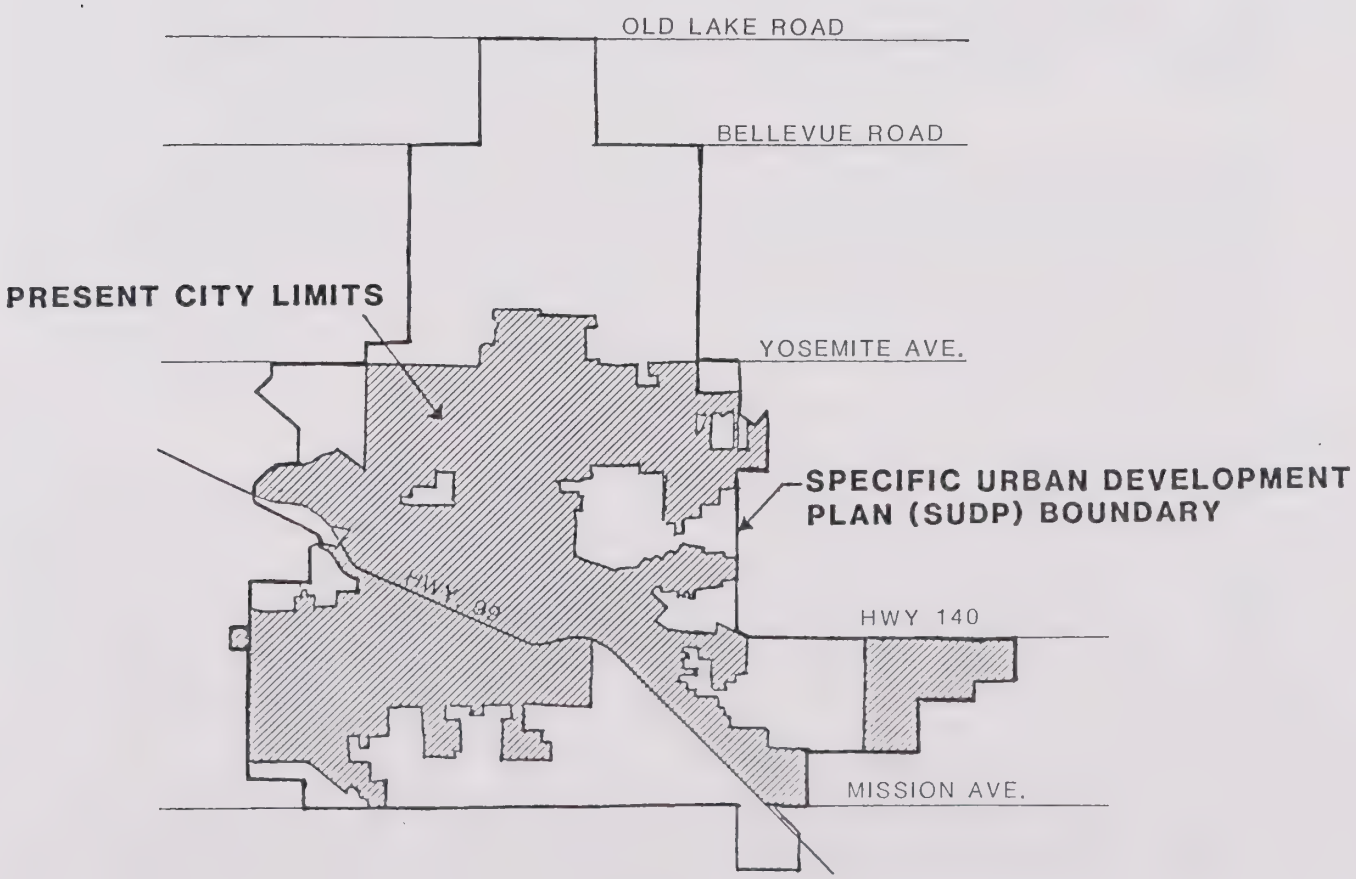


FIGURE 3

LONG-TERM PREDICTION IS DIFFICULT BUT NECESSARY

Making long-term predictions involves uncertainties, especially when projections are for 40 years. In fact, few attempt it besides science fiction writers and futurists. Cities regularly engage in planning for 10 and 20-year periods. A 40-year planning period is rare but could prove to be a valuable tool in Merced's future planning decisions.

A major premise of this Growth Study is that most cities of 250,000 (Merced's expected population in 40 years) are undesirable places to live and work because of traffic congestion and other problems. By determining now what type of land use patterns and related transportation systems will be necessary in 40 or 50 years, adequate street rights-of-way can be established to minimize future undesirable traffic problems. The same concept applies to other public facilities (i.e., sewers, water, parks and open space, bikepaths, etc.) that will be necessary if future Merced is to avoid the ills of most medium-sized cities.

There are many factors that affect Merced's resources and way of life. One of the most critical is population, including age groups, income levels and personal values. Also important are: private capital investments, the economy, research and technological breakthroughs, and governmental actions. Natural, local or regional phenomenon such as droughts, earthquakes and floods can also have a big impact.

These and other factors will greatly alter future Merced. They are of greater magnitude when projecting for a 40-year period. With this in mind, it is easy to question why anyone would want to chart a long-term future course for Merced.

It is obvious that certainties are few. In fact, change is the only certainty. Major changes and complex problems will occur in the future. Although the future is unpredictable, we have certain abilities to foresee tomorrow as the direct consequences of today. There are certain policies and actions that we can take today that will help us avoid the mistakes made by other cities that have travelled this population growth path before us.

INDIVIDUAL PHILOSOPHIES ABOUT GROWTH

Many people believe that local government should formulate and adopt a population growth policy. Others believe the opposite. Critics and supporters alike may be assured, however, of one fact - Merced will continue to grow, and it will have a growth policy, either consciously adopted, or by default as a result of uncoordinated action by many agencies. The real issues a growth policy must take into consideration are: the amount of population, the growth rate, location of the future population, level of public facilities, and development standards.

Merced is not an isolated community. It is part of a growing region. Even if the City of Merced decided to greatly restrict its growth, it would have to deal with growth that would occur in its fringe area. This growth and the way it is guided directly affects the quality of our life.

Until recently, most people believed that continued population growth was either inevitable or fundamentally good, or both. Furthermore, if a lot was good, more growth would be even better. Many still hold similar views; but, the consensus is gone. There are now several different viewpoints toward population growth.

Four of these different viewpoints are summarized below:

1. Growth is Inevitable - This viewpoint sees continued and sustained growth as inevitable, with the basic variable being the way in which growth is accommodated.

2. Growth Equals Progress - This viewpoint equates growth with quality and progress. Those holding this belief may or may not assume that growth is inevitable. In any event, growth is considered as the measure of community progress.

3. Growth Should be Stopped or Greatly Limited - This viewpoint sees population growth as the root cause of most urban problems, especially environmental impacts and social problems such as loss of agricultural land and open space, traffic congestion, air pollution and rising crime rates.

4. Growth is a Variable to be Influenced in Pursuit of a Desirable Quality of Life - This viewpoint sees growth as a critical variable, subject to strong inter-governmental (including local governmental) influence, which establishes both opportunities and constraints for an acceptable quality of life. To help achieve quality of life goals, the extent of permitted growth must also be considered.

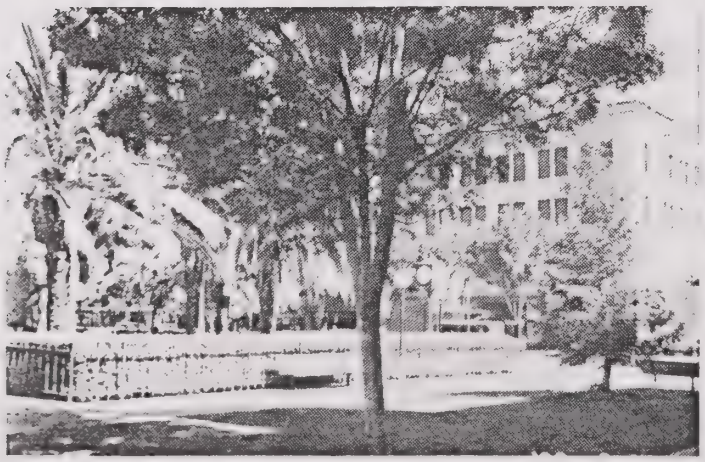
The fourth viewpoint guides this Plan. It should be clear, therefore, that the fundamental issue in the Study is not what Merced's ideal population is, but rather what direction such growth should take and what will be required to accomplish the quality of life Merced is seeking.

2 COMMUNITY PROFILE

MERCED 2030

MERCED - A SPECIAL PLACE TO LIVE

Merced is currently considered by many of its residents as a special place to live. Conveniently located shops and services, a revitalized downtown, attractive new development, tree-lined streets, picturesque residential neighborhoods, ample recreational opportunities, reasonable traffic circulation, and a comparative low cost of living are some of the many positive aspects of Merced living. Many people are attracted to Merced because of these features that make for a fine quality of life and a great place to raise a family. It will be a major challenge to retain this feeling of a special place as Merced continues to grow.



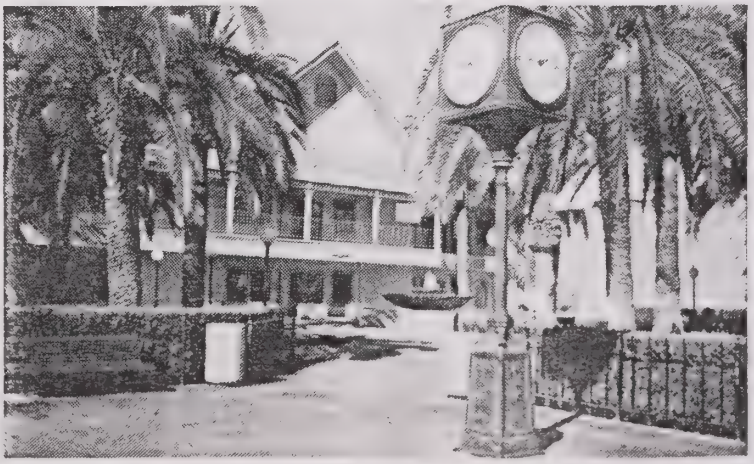


FIGURE 4

FACTS ABOUT MERCED

The City of Merced is a community situated in the California San Joaquin Valley between the cities of Modesto and Fresno. Merced presently covers 15.5 square miles of relatively level ground traversed by four creeks. New residential development in Merced is occurring both north and south of Bear Creek as shown below, with more activity generally to the north. Bear Creek divides North Merced from Central Merced, which includes a redeveloping downtown and a number of historical buildings. South of downtown is State Highway 99 and South Merced which is currently being improved via implementation of the South Merced Improvement Plan. Summer temperatures reach into the high 90's and the winter brings ground fog and rain. Spring and Fall are pleasant with moderate temperatures. Airline service is provided at the municipal airport located in the southwestern part of the City.

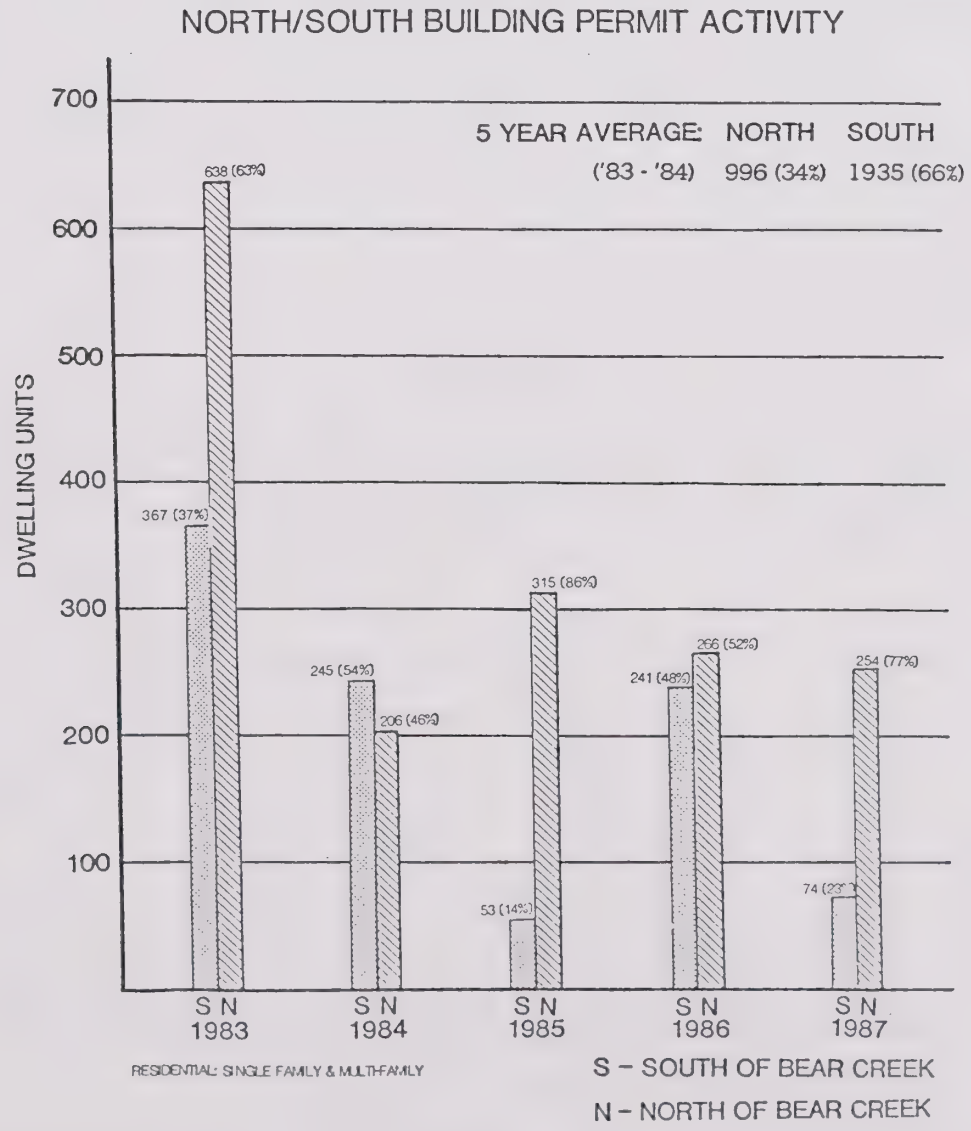
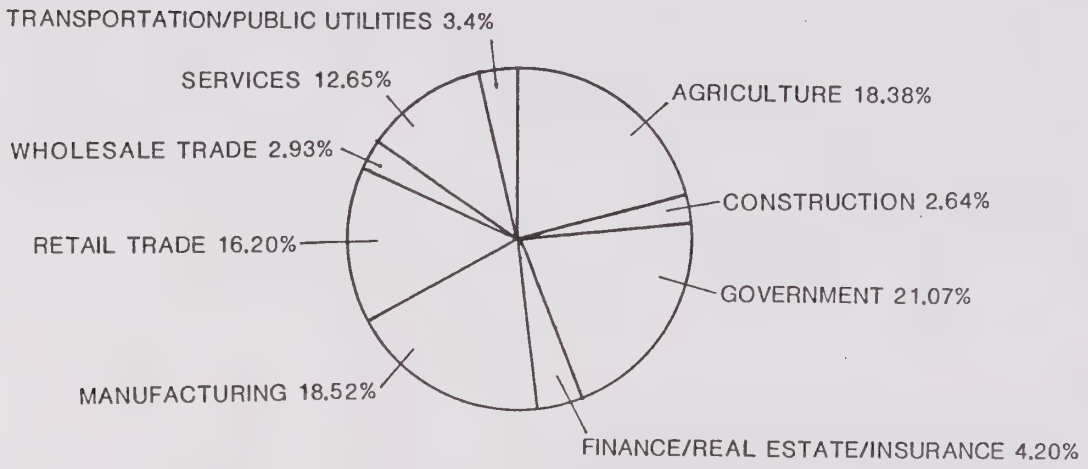


FIGURE 5

Merced, primarily an agricultural service center, also acts as the Merced County Seat. The percent distribution of types of wage and salary employment in Merced County is shown below.

PERCENT DISTRIBUTION OF WAGE & SALARY EMPLOYMENT
MERCED COUNTY 1985



SOURCE: California Employment Development Department

FIGURE 6

Nearby Castle Air Force Base employs approximately 8,500 people and is an important contributor to the local economy. Persons between the ages of 25 and 34 and those between 5 and 13 comprise the largest age groups, with the majority of the population between the ages of 19 and 54, as shown below.

POPULATION BY AGE DISTRIBUTION

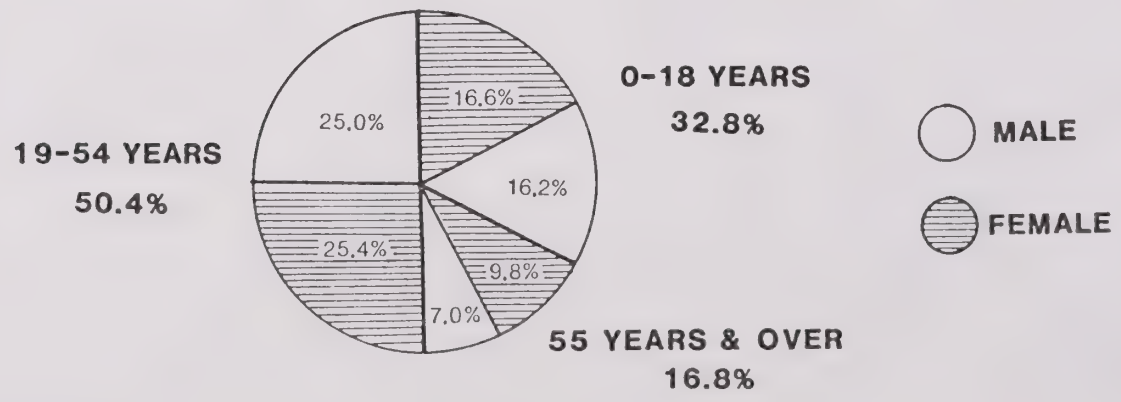
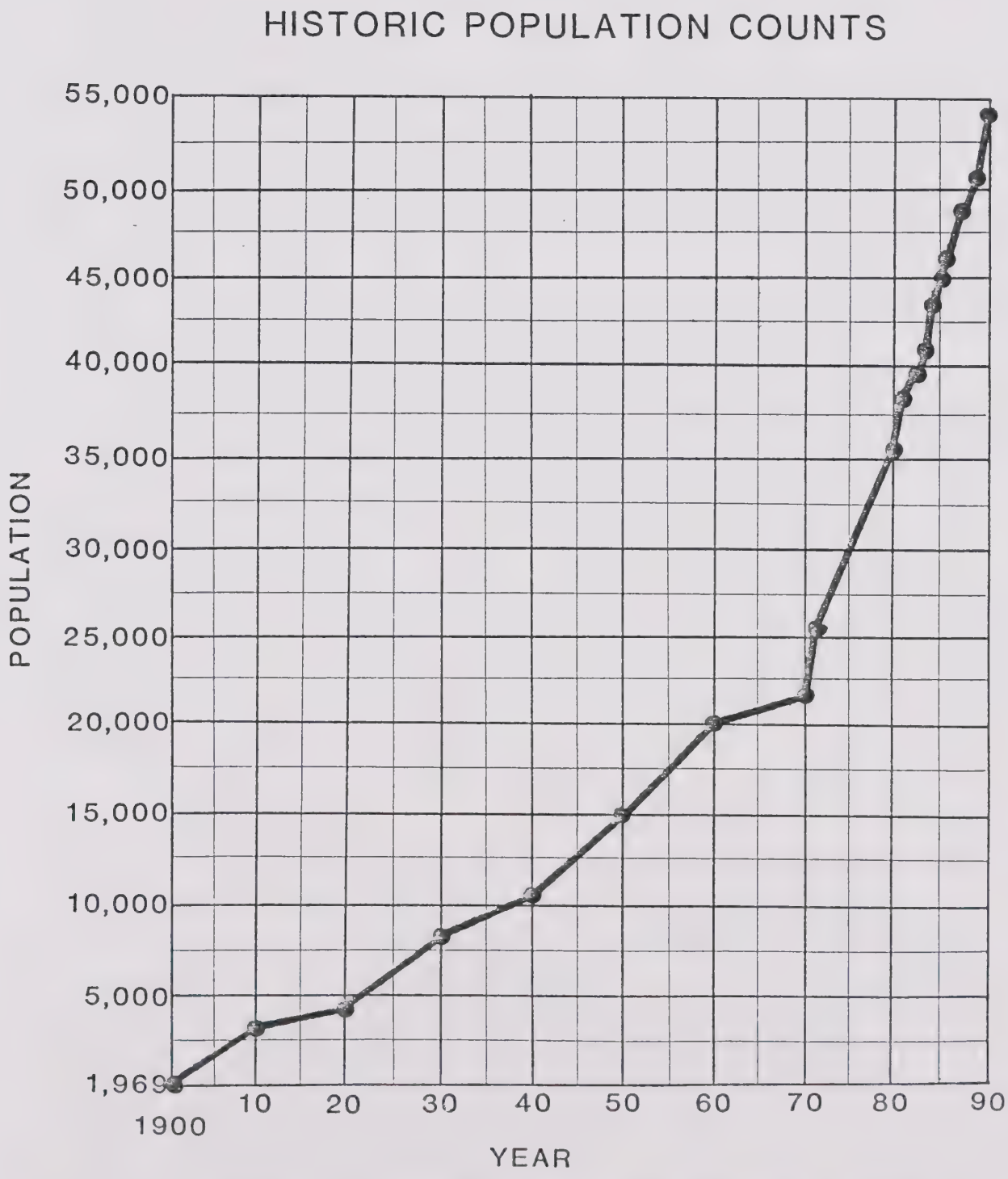


FIGURE 7

MERCED'S HISTORICAL POPULATION GROWTH

Historic population growth (1900-1988) is shown below. The population as of January 1989 is 53,550. Merced is experiencing an annual growth rate of 4% to 5%.



SOURCE: U.S. Census Data California State Department of Finance

FIGURE 8

Similar growth rates have been experienced in other valley cities. The graph below shows the comparative historic populations of Stockton, Fresno, and Modesto. A probable growth range for the City of Merced is included. It is interesting to note how Modesto's actual growth and Merced's probable growth are similar. Merced could very well be the size of present Modesto in 20 years.

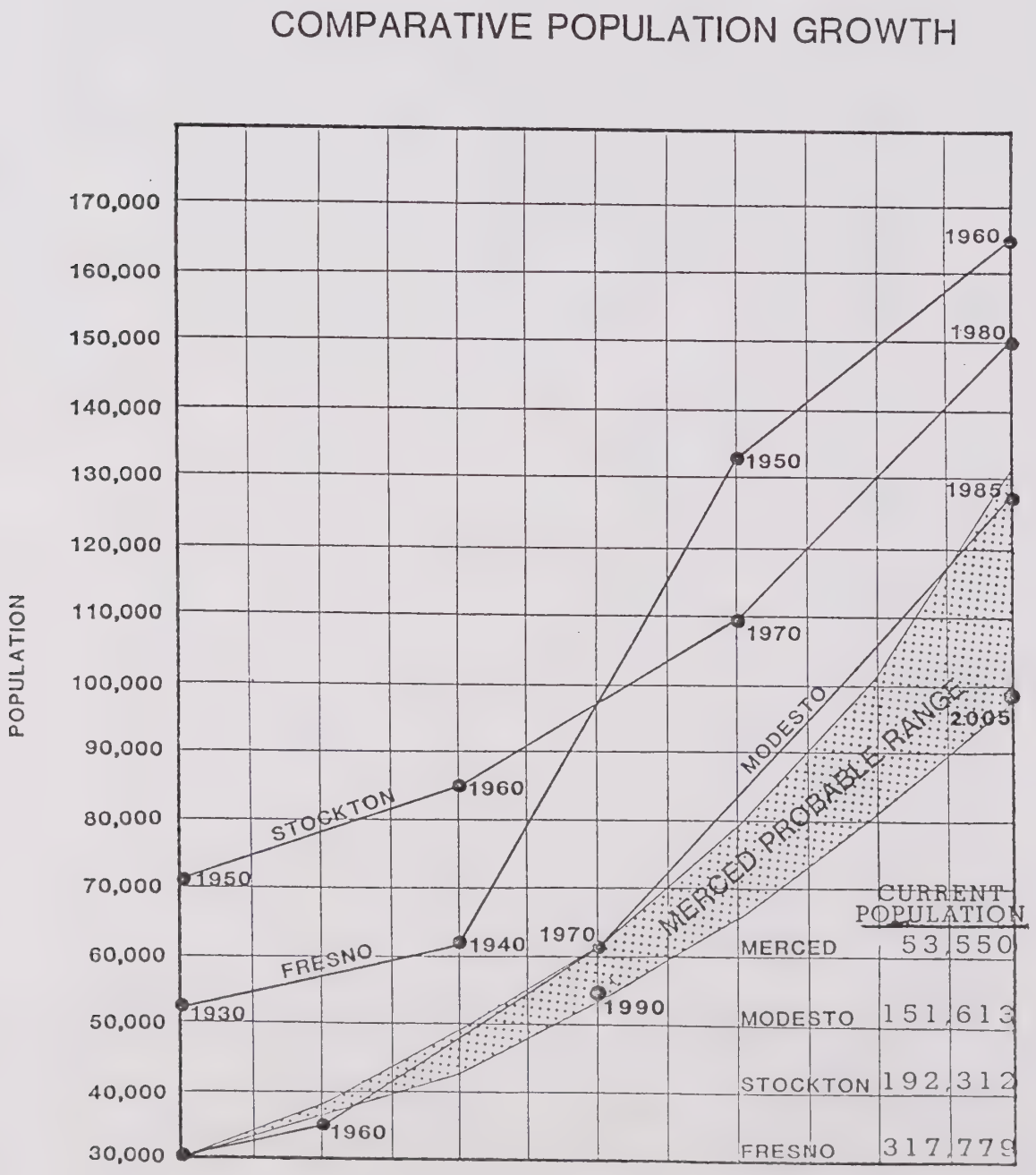


FIGURE 9

3 MERCED 2030 PARAMETERS

ASSUMPTIONS

The Growth Plan assumes a steady population growth projection of approximately 4% to 5%. At this rate, the City will reach a population of 250,000 in 40 years. The Merced 2030 Plan analyzes the possible development areas and growth constraints expected over these next 40 years.

The Plan envisions a city with 250,000 people. The 250,000 figure was selected as a target population for the Growth Plan for the following reasons:

1. Given the growth-inducing forces both north and south of Merced, it is reasonable to expect Merced to eventually reach this size; and at present growth rates, this will likely occur within 40 years.

2. 250,000 is approximately the maximum build-out population that can be serviced by the current sewage treatment plant (with expansion) under present Federal and State regulatory standards and current technology without having to be replaced or relocated.

CONSTRAINTS

The following physical growth constraints are currently present within and outside Merced's present SUDP or designated growth area.

1. Growth is restricted around the Municipal Airport due to noise and safety hazards associated with the flight path. Growth around the airport cannot easily be accommodated without jeopardizing both the developing area and the presence of the airport.

2. Growth is limited to the south due to flood potential, as shown below.

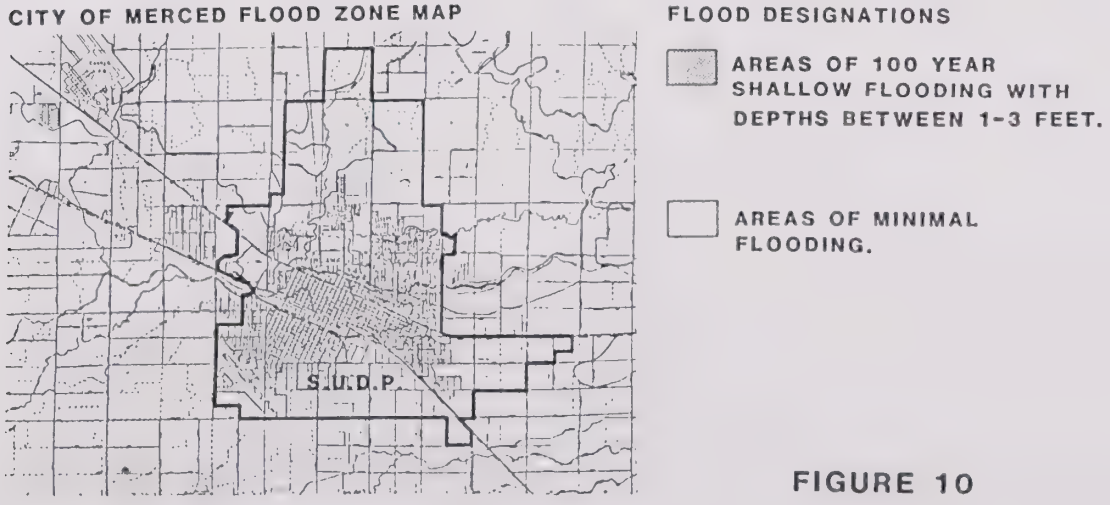


FIGURE 10

3. Growth is limited to the northwest due to unacceptable noise levels (see Figure 11 below) and safety hazards associated with Castle Air Force Base's flight path (i.e., possibility of plane crashing, property damage by vibrations, and exposure to higher concentrations of jet fuels).

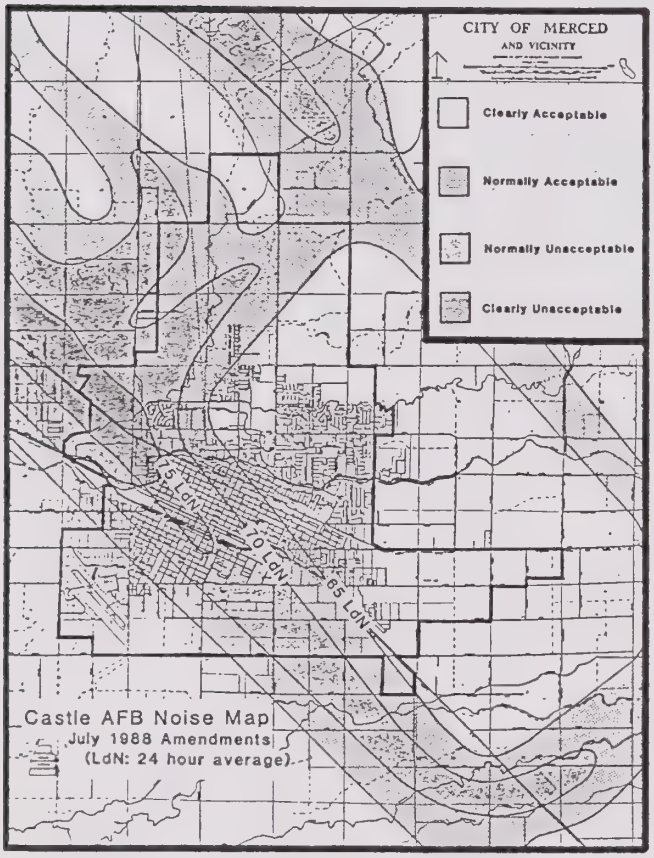


FIGURE 11

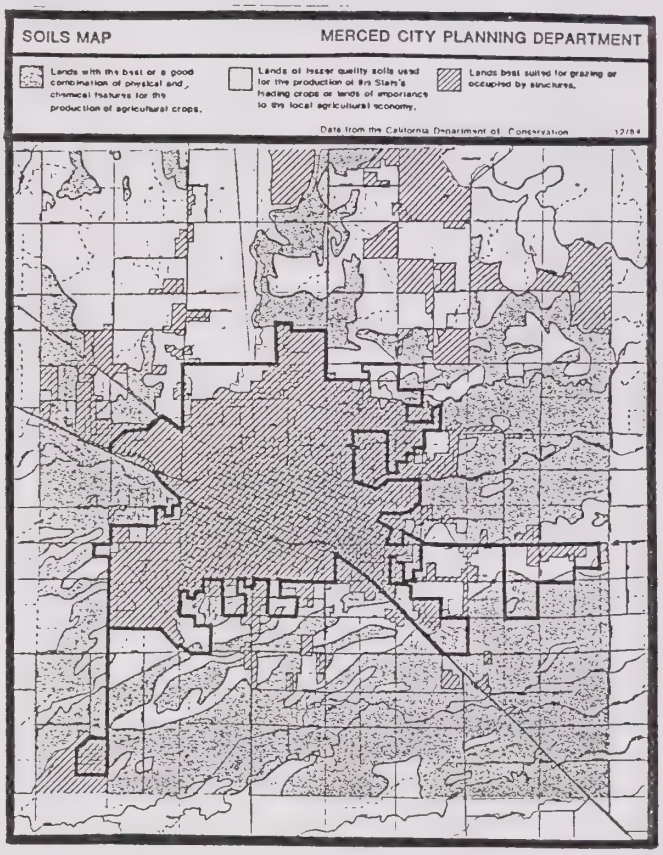


FIGURE 12

4. Growth is undesirable to the east and west due to good agricultural soils, as shown above and below.

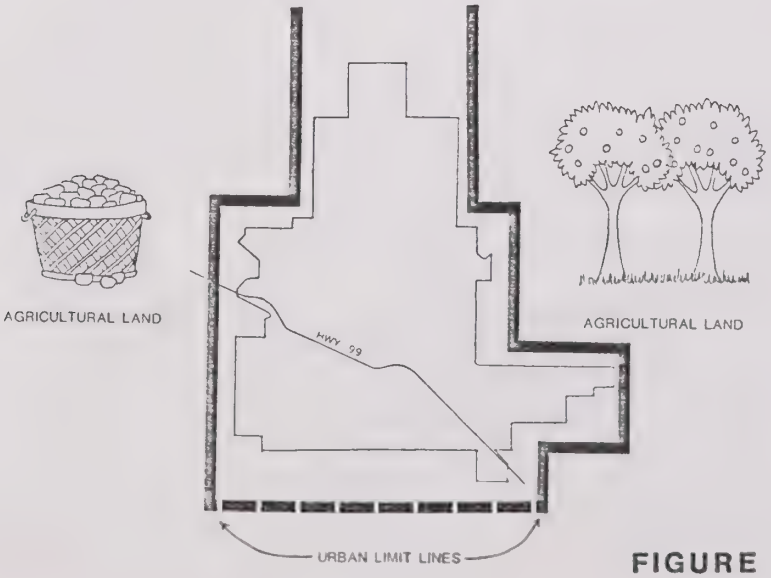


FIGURE 13

EFFECT OF TRANSPORTATION SYSTEM ON GROWTH PATTERN

Transportation facilities such as streets, expressways, and bus systems and their location, have a major influence on shaping the growth pattern of a city. In addition to carrying people and goods, they influence the development pattern by affecting the location of industrial areas, shopping centers, residential neighborhoods and recreation areas.

Much of the traffic on Highways 59, 99, and 140 merely passes through Merced on its way to somewhere else, and West Olive Avenue contains traffic going to and from Castle Air Force Base and Atwater. These facilities are regional in nature. As a consequence, transportation decision making involves a multitude of Federal, State, regional and local agencies with many conflicting interests. As a result, critical decisions are often deferred, or if made, are not effectively implemented. Adding to the problem is the tremendous cost of obtaining necessary rights-of-way and constructing and maintaining transportation facilities. In the past, the Federal and State Governments paid for significant portions of intra-city freeways (e.g., Highway 41 in Fresno). In the future, much more of the costs will fall on cities alone. One example of the difficulties involved in this is what we have gone through to put together enough funding to improve just a portion of East Olive Avenue.

Because of this, we should assume there will be few, if any, dollars available for intra-city freeways and therefore build expressways if we are to avoid major traffic congestion. Also, to the extent that we can, we should locate land uses and activities in such a manner as to encourage the use of public transportation (e.g., fixed route buses) and non-motorized transportation such as walking and bicycling. The Village Concept, discussed in later chapters, is one growth model alternative which greatly facilitates these alternative transportation modes. In addition to reducing transportation costs, it reduces traffic congestion, noise, air pollution and energy consumption.

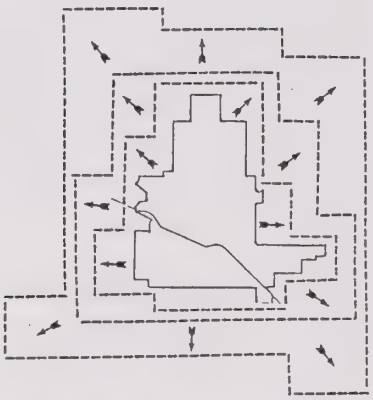
4 GROWTH CONCEPTS

MERCED 2030

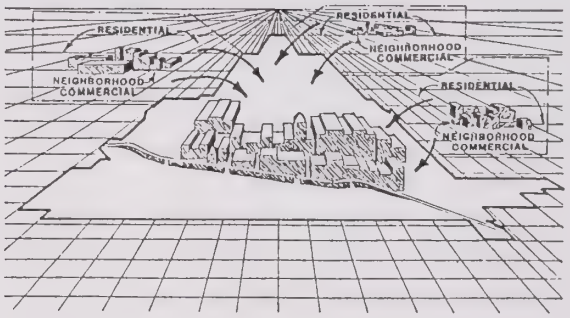
GROWTH PATTERNS

Cities experience many internal and external forces which determine what type of development will occur and its location. These factors include, but are not limited to, environmental constraints, livability, travel habits of residents, existing infrastructure, economic and political factors. Even without a long-range growth plan study, Merced will continue to grow. Growth would take place as it has in the past, incrementally, with annexations within the Specific Urban Development Boundary (SUDP), extension of streets and services, and eventual changes in the SUDP boundary.

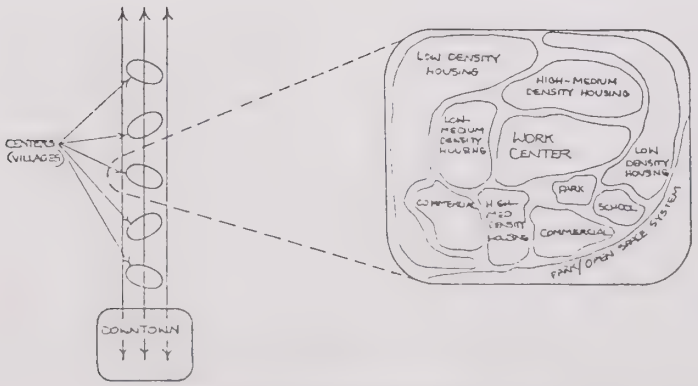
In this Section, three theoretical Growth Models will be discussed in relation to how Merced's future growth could be structured: (1) the "Sprawling City" Model (known as "urban sprawl"), (2) the Central City Model (one expanding downtown with concentric "bedroom communities"), and (3) the Multi-Center Model/Village Concept (a downtown with multiple "villages").



"SPRAWLING CITY MODEL"



"CENTRAL CITY MODEL"

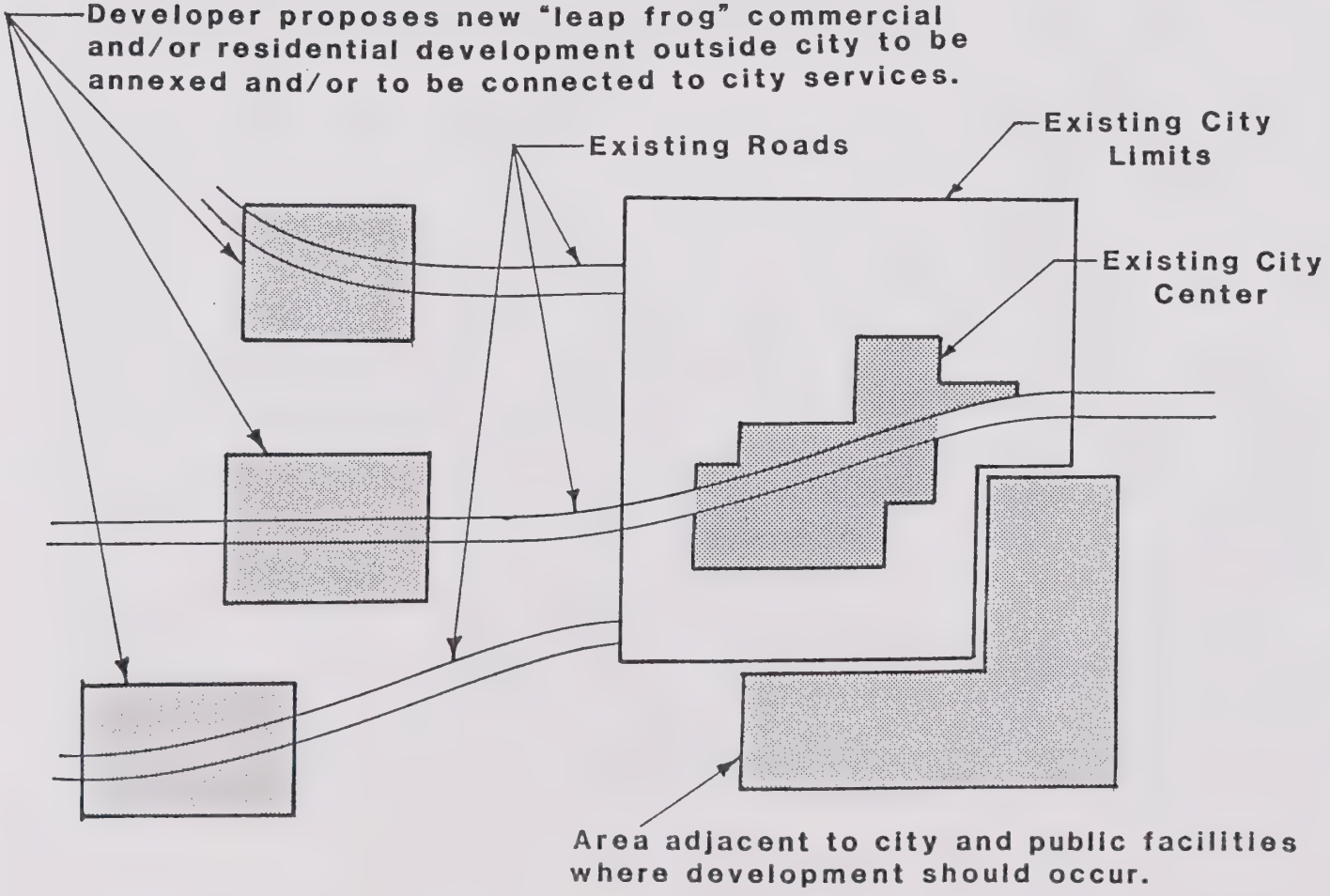


"MULTI-CENTER MODEL"

FIGURE 14

"SPRAWLING CITY" MODEL

The "Sprawling City" Model is characteristic of how a majority of U.S. Cities grow today. "Urban Sprawl" is simply defined as land uses which have ceased to be centrally located to meet the citizens' immediate needs; i.e., school work, shopping, recreation, etc. The main premise of this model is as cities expand under typical land use zoning, existing streets are widened (generally through acquisition and demolition of already-developed property) and utility lines are extended. Cities typically grow toward lands which are: easily developed, have the fewest development constraints, and are least expensive. It should be noted that often these lands are not the best place to grow in regards to good land use or circulation planning, nor in regards to providing City services efficiently.



TYPICAL CITY "LEAP FROG" EXPANSION

FIGURE 15

This type of "leap frog" development is often initially less expensive for developers and the homebuyers and businesses that locate there. However, it leads to very unsatisfactory living environments and major expenses for taxpayers stuck with the future problems (traffic congestion, air pollution, etc.) created. The figure below is an example of a "sprawling city".

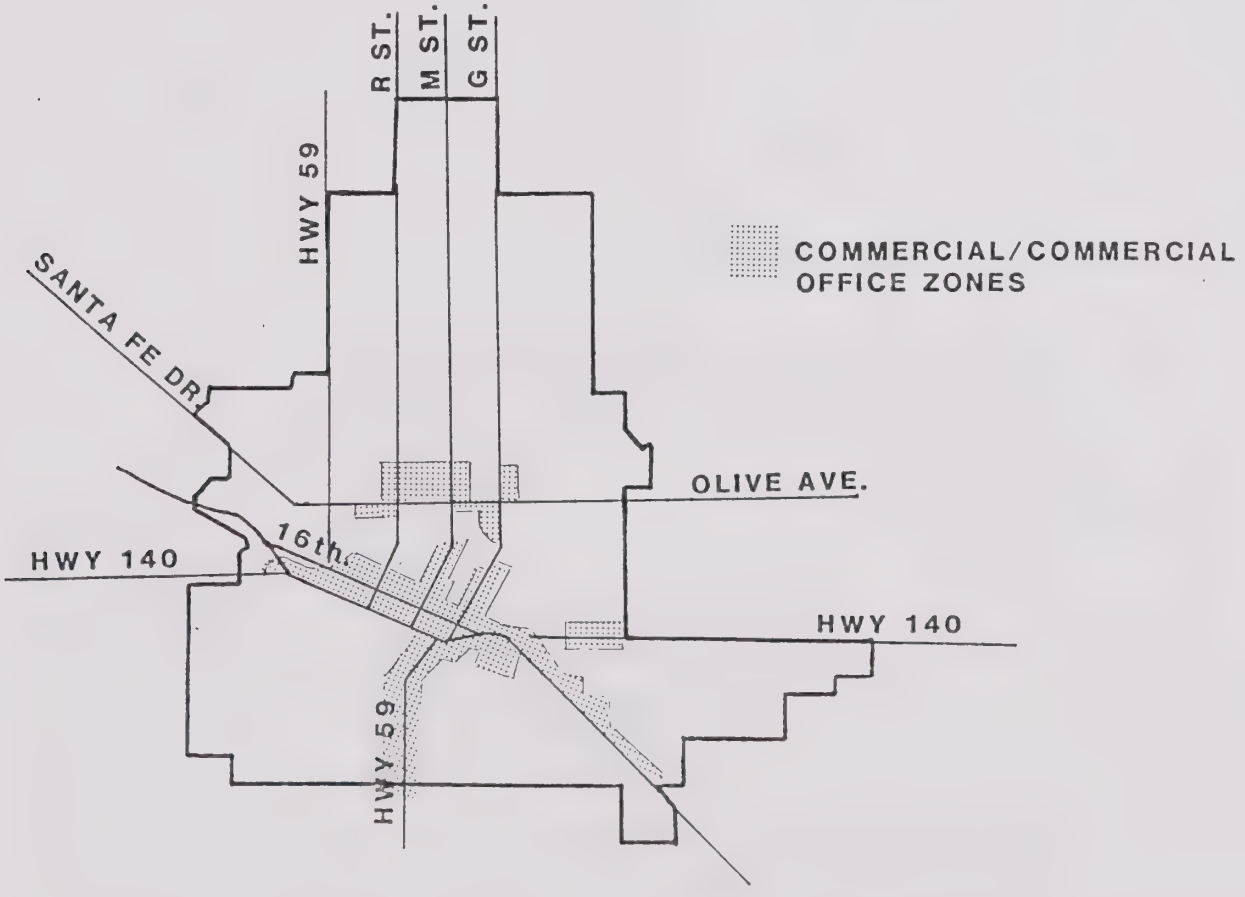
SOURCE: MAN-MADE AMERICA

FIGURE 16

Merced has experienced some "urban sprawl" as growth has moved away from Central Merced to the south and north. When the Merced Mall was built in the 1960's on Olive Avenue north of downtown, most new development moved to the north to take advantage of this new commercial core area, which although automobile-oriented, contains clustered commercial activities interspersed with residential uses rather than typical strip commercial development.

Most commercial development in sprawling cities is located along major streets in commercial strips with no central area and few residential uses. These strips are unsightly and cause severe traffic congestion as each business requests multiple curb cuts along the major street, which slows down traffic as cars pull in and out of these driveways. McHenry Boulevard in Modesto and Blackstone Avenue in Fresno are extreme examples. There are also examples of strip commercial development in Merced such as South Highway 59, 16th Street, and Yosemite Park Way.

Although Olive Avenue and Main Street from "J" to "N" Streets are better than strip commercial development, the Village Concept described in the next chapter appears to offer many additional advantages.



RELATIONSHIP BETWEEN COMMERCIAL ZONING AND TRANSPORTATION CORRIDORS

FIGURE 17

Merced is still fairly compact and centralized. Only some "Urban Sprawl" has been allowed to occur; but without proper planning, Merced could still follow the "Sprawling City" Model. If allowed to follow such a dispersed pattern, growth in Merced would proliferate on properties currently along existing transportation corridors, causing the need to increase street widths and traffic signal systems at major costs to the public. In spite of the additional improvements, major traffic congestion would occur. The growth pattern in the City of Fresno is a classic example of the "Sprawling City" Model.

CENTRAL CITY MODEL -- CONCENTRIC GROWTH

The Central City Model with concentric or "ringed" growth would build upon the existing infrastructure and improvements within the City limits. For example, in Merced, the downtown and Merced Mall area would be intensified (especially the downtown) and growth might go upward in the downtown with the construction of taller buildings and parking garages to handle increased density. A regional shopping mall could be built adjacent to Highway 99. This would be more likely if progressive Redevelopment policies are carried out, coupled with growth management on the City's fringe.

New major commercial growth would augment the existing business/commercial centers instead of creating new centers. The new outlying growth would be primarily residential with neighborhood support services only (i.e. neighborhood centers, schools and parks). These outlying growth areas would be "bedroom communities" to existing business and commercial areas, with most people traveling into the City Center for work and recreation. Residential growth would occur in Merced on land to the east, west, and north of the present City limits. There are examples of the bedroom community land use pattern in Southern California and in the Bay Area and the traffic problems it causes.

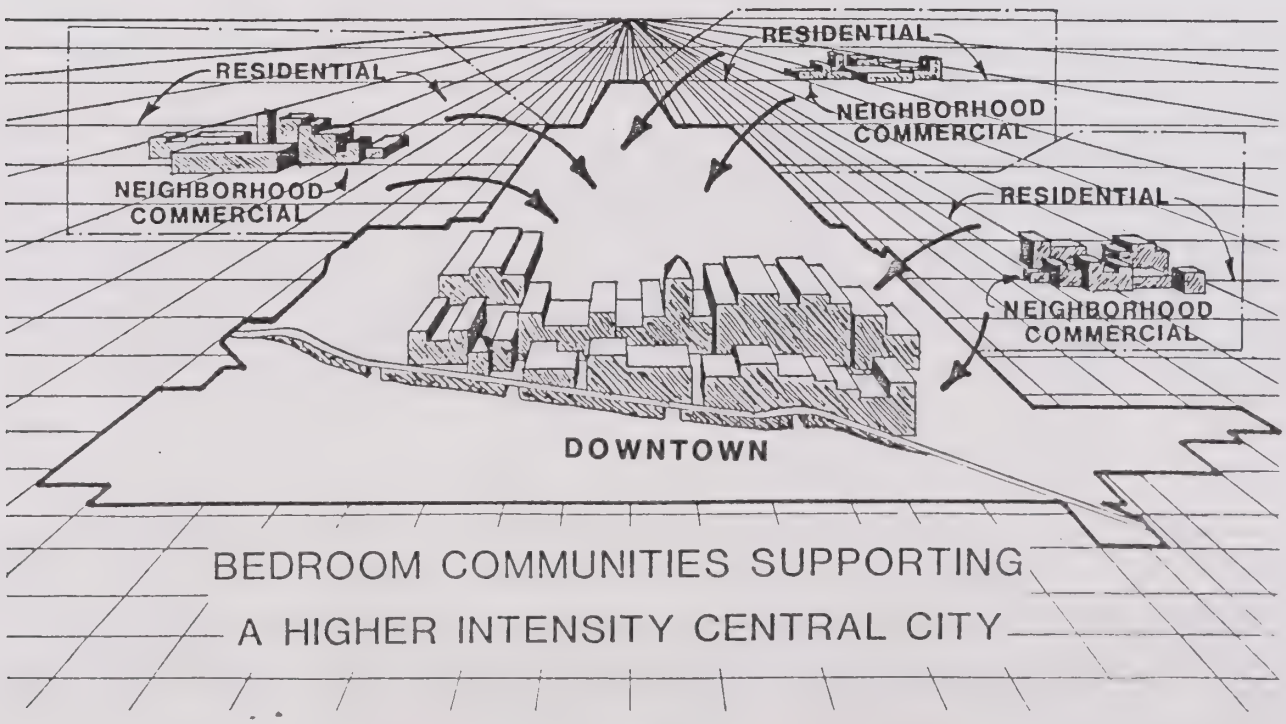


FIGURE 18

MULTI-CENTER MODEL - VILLAGE CONCEPT

The Multi-Center Model (Village Concept) would create a series of connected self-contained "satellite communities" or "villages" while still recognizing downtown Merced as a community focal point. The City would strive to maintain the downtown's economic viability while at the same time greatly reducing the need for "cross-town" traffic.

This model recognizes that most people prefer to live close to work, school, shopping and recreation opportunities, while traveling occasionally to regional shopping centers or sporting events, social and cultural events. The concept of Multi-Center growth is shown graphically below:

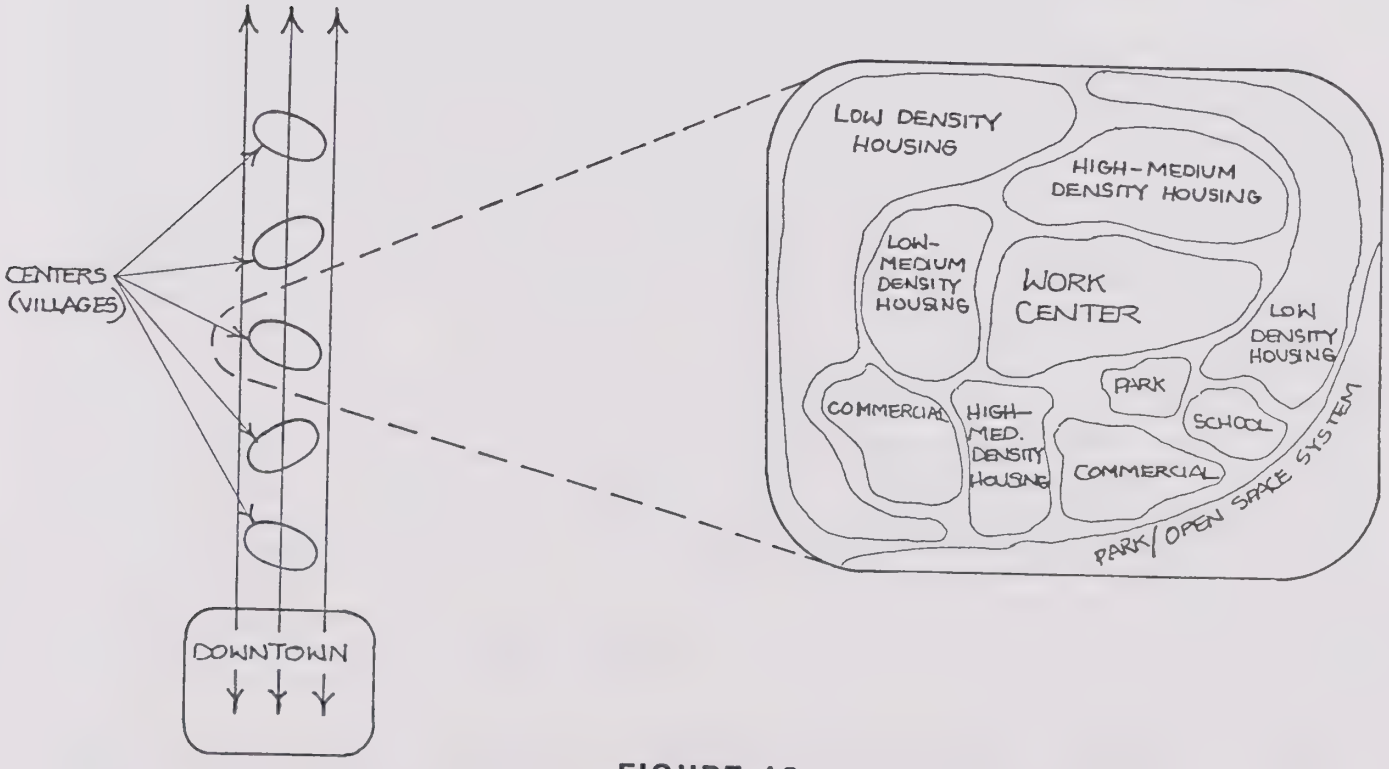
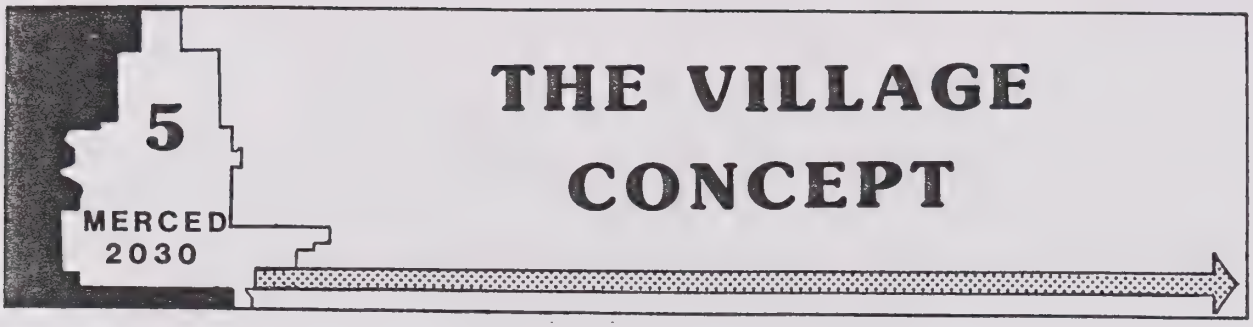


FIGURE 19



THE VILLAGE CONCEPT

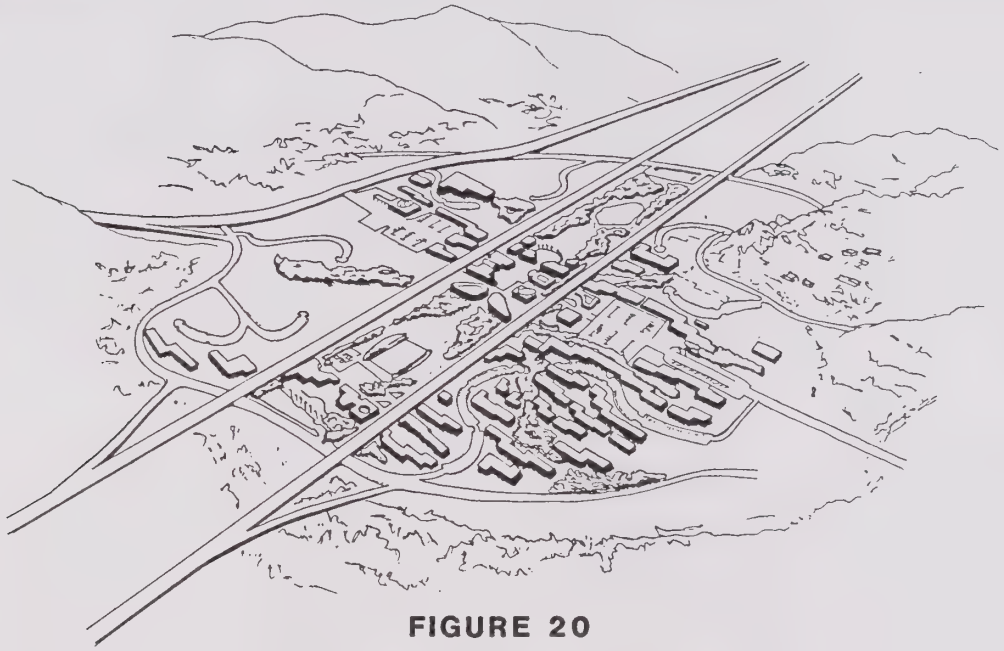


FIGURE 20

THE VILLAGE CONCEPT OF GROWTH

The Village Concept (Multi-Center Model) was selected from the three possible Growth Concepts as offering the best potential to lessen the adverse effects of growth, as compared to the Sprawling City or Central City models. The Sprawling City Model results in inefficiencies in providing services to residents, and fostering excessive auto usage and, therefore, severe traffic congestion. Expensive retrofitting of Merced as it exists today was also noted as an argument against this means of growth. The Central City Model results in the small-town character of the downtown being lost, generates a great deal of cross-town traffic, and would be costly to retrofit on present Merced as well.

A basic assumption of the Growth Study from this point in the report is that growth will occur in "villages" Each of the four growth scenarios in later chapters incorporates villages. The concept of structuring Merced's growth in a series of villages is designed to promote a "small town" feel in spite of major growth. Many cities have succumbed to pressure for traditional development and an incoherent "urban sprawl" has resulted. When sprawl is allowed, services and urban functions are inefficient and the entity providing services is less able to plan and provide for an efficient use of resources. Socially, residents and visitors lose their sense of place, belonging and control over their environment.

The village concept can promote a sense of community for its residents within a larger urban context. If this idea was adopted, each village would be characterized by:

1. a higher density, mixed-use (i.e., light industrial, commercial, offices and residential), pedestrian-oriented core;

2. low density residential peripheries;

3. a gradual transition from higher intensity commercial and industrial land uses at the "core" of the village to low intensity residential uses at the "edges".

4. limited village population size of approximately 25,000 to foster a small town community atmosphere;

5. a village center easily accessible to all residents;

6. absence of inefficient strip commercial development;

7. opportunity to live and work in a village with a wide-range of activities, employment, shopping, recreation, and housing types.

Each village is intended to be generally self-contained with a well-defined commercial/service core surrounded by higher density residential uses. These are circled by single-family homes (6,000-square-feet lots) and residential density decreases as homes approach the fringes. Each village would be made up of about 5,300 single-family homes on 1,375± acres. There would be another 2,050 units of low-medium density development on 230± acres. The high-medium density and high density units would be located on 175± acres and number about 3,150. Beyond the fringe to the east and west, open space and agriculture is preserved. A village is linked to another via major transportation corridors. (See Figure 21 for a prototype village.)

The following parameters could effectively implement the village concept:

1. Residential densities; low (LD) = 2 to 6 dwelling units per acre; low to medium (LMD) = 6 to 12 dwelling units per acre; high to medium (HMD) = 12 to 24 dwelling units per acre, and high (HD) = 24 to 36 dwelling units per acre. Higher densities would be closer to the village core.

2. Commercial acreage (community service type) = approximately 80 to 100 acres total.

3. Light industrial/business park = approximately 60 to 80 acres total.

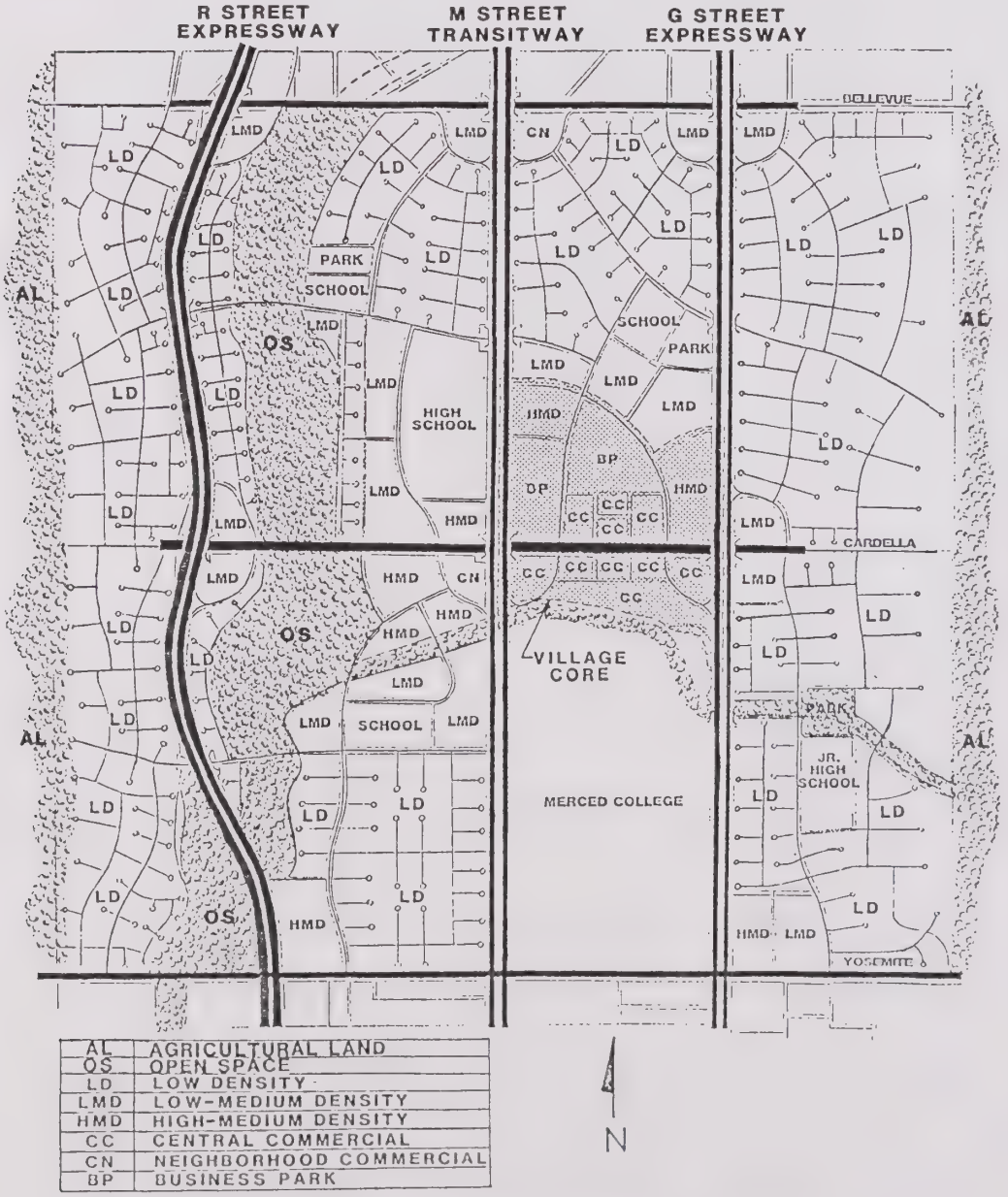
4. The core should surround a town square/plaza with special public amenities.

5. The core should be a multi-service center/focal point serving the surrounding village of up to 25,000 people.

6. The core should have a fire station and a community center. Other public facilities deemed necessary may be added, such as a post office or branch library.

7. Approximately 125 acres of park land should be set aside or dedicated for each village. This is consistent with the current amount required by the General Plan - five acres per 1,000 people. The acreage could include: (1) village center public space (similar to Courthouse Park); (2) greenbelt and open space corridors around and in village to accommodate possible bikeways; and (3) neighborhood park (to be tied into schools where possible).

8. The core design should allow pedestrian movement through its uses and integration with surrounding development.



CONCEPTUAL LAND USES WITHIN PROTOTYPE VILLAGE

FIGURE 21

As noted above, the Village Concept envisions integrating industrial and commercial job centers into the villages in order to limit the need for long, cross-town commutes between working and living areas. If successful, this would greatly enhance our chances of avoiding severe traffic congestion found in most cities of 250,000, as well as providing a convenient, self-contained living environment. See Figure 22 for a prototype village core area north of Merced College.

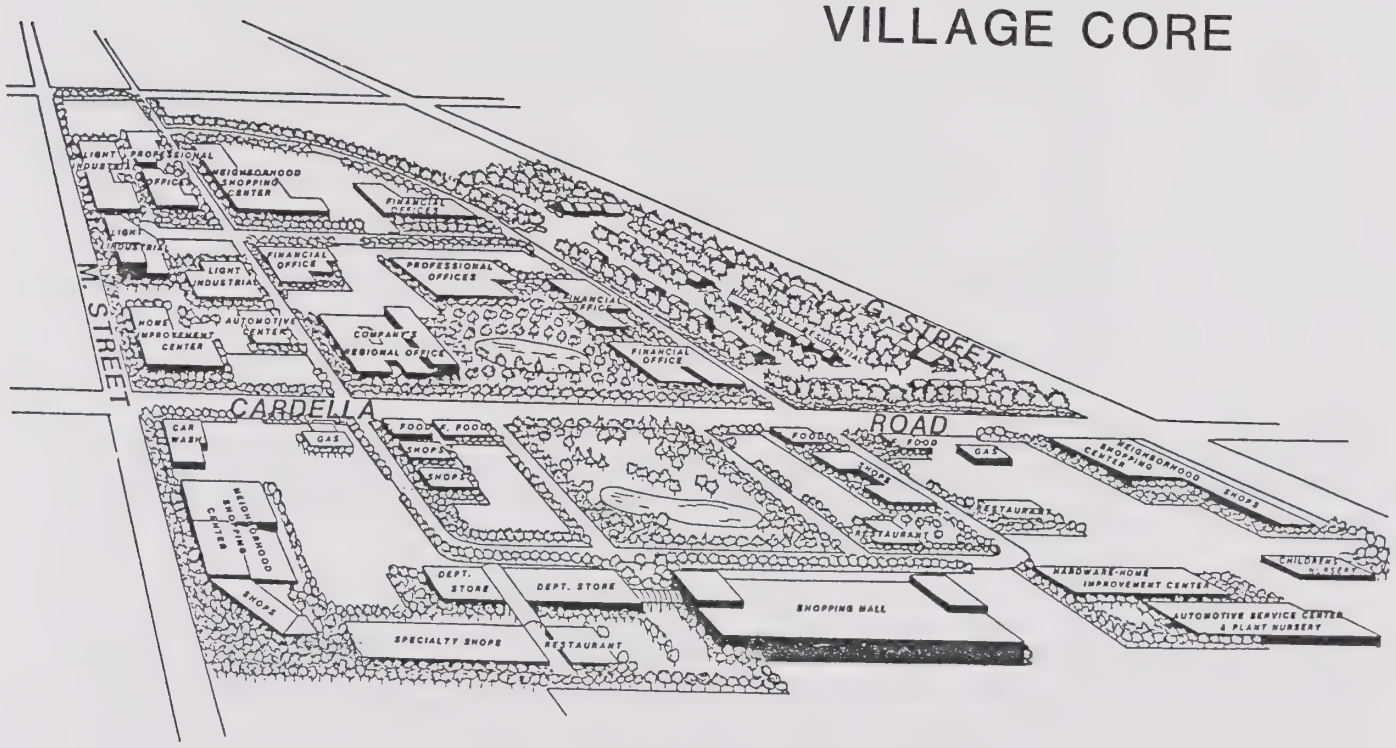


FIGURE 22

Unfortunately, few cities in our Country have been able to integrate living and working areas on this scale. There are many reasons: industries desire to locate near freeways and State highways (e.g., Highways 99 and 59) and homebuyers stress price and certain home features more than proximity to work, until commute times become unreasonable. Because of this, most cities with "villages" such as Phoenix and Irvine have not tried to integrate major job centers into their villages. Instead, they have combined neighborhood commercial shopping and services along with recreational and open space amenities. Modesto is currently considering this more traditional "village" concept. The City of Colorado Springs a few years ago established a policy of dispersing major industrial and office centers in connection with outlying residential areas. They have found to date that although a number of businesses have located in these fringe areas, that most employees still seek out housing based on reasons other than proximity to work.

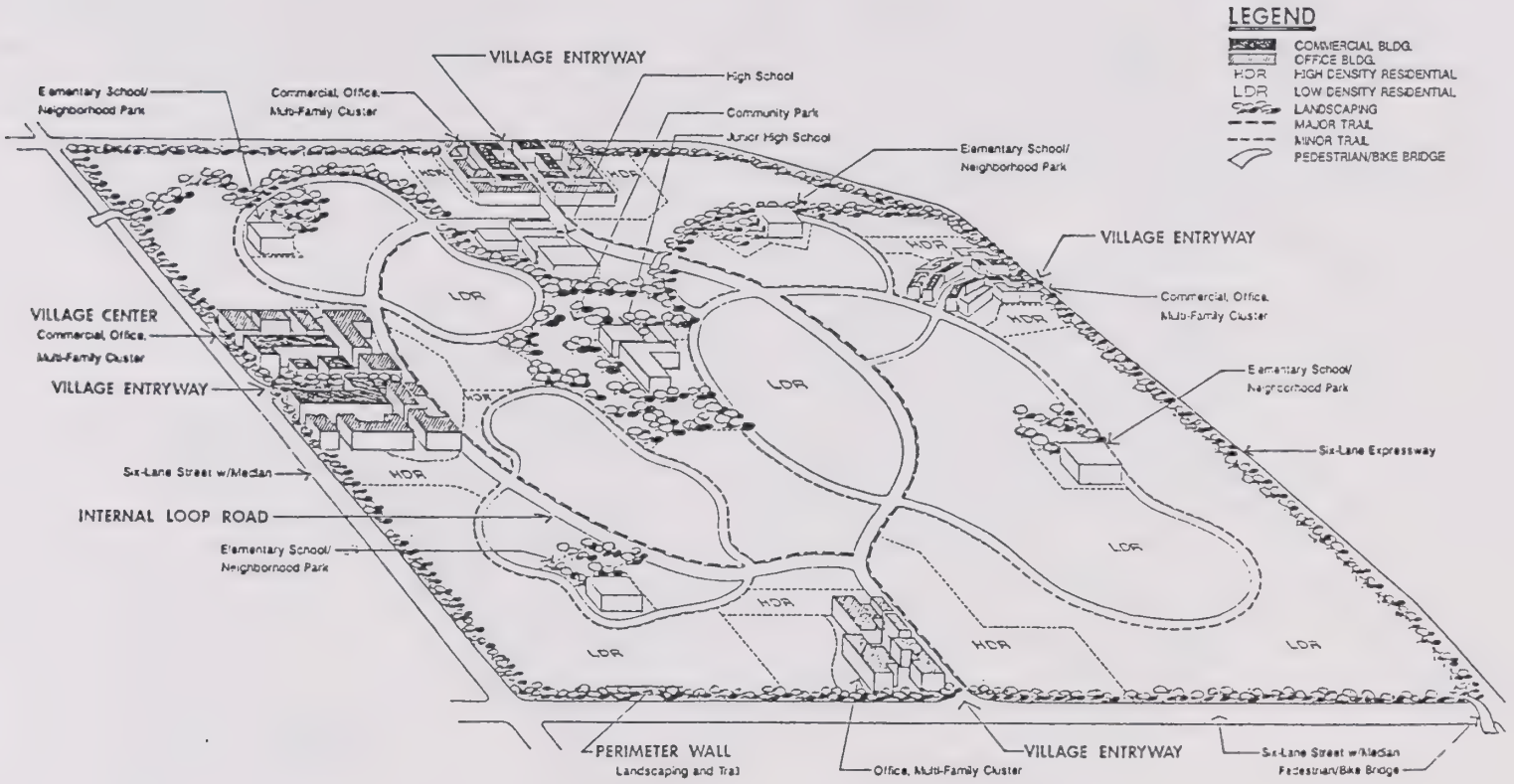
The type of village suggested in this plan which combines living and working areas would be very desirable. However, if we do decide to develop villages and they turn out more like the traditional residential/neighborhood commercial village, then there will be much more potential for traffic congestion. With this in mind, we have developed a street system in each Growth Scenario that assumes that 80% of the village vehicular trips will be to and from areas outside the village. It is important that we take this conservative approach on how much the villages will reduce traffic in order to assure enough lane capacity in our future street system.

MODESTO'S VILLAGE CONCEPT AND THE PEDESTRIAN POCKET

Two other patterns of growth based on the Multi-Center Model are currently in the news, Modesto's Village Concept and the Pedestrian Pocket. Although similar in concept, they differ significantly from Merced's Village Concept, described above.

Modesto's "Villages" will house approximately the same population in the same amount of area as Merced's plan, but there are important differences. Modesto envisions a village surrounded by a wall, open space areas, and an expressway along the perimeter, with access to the village limited to three or four entrances. Neighborhood shopping centers, offices, and multi-family housing would be clustered at these entrances and a looped collector street will carry all traffic through and out of the village (see Figure 23). Each Modesto village is mainly residential in nature with its own schools, shops, and recreational facilities, but no major work centers, so residents will have to commute out of the village to work, unlike Merced's village. There is no single village core area as in Merced's plan, but multiple areas for commercial activities at the entrances. The limited access into Modesto's village creates a more exclusive atmosphere than Merced's village which will be more accessible to residents of the village and of the entire City, and will lend itself more readily to mass-transit in the future.

MODESTO'S VILLAGE CONCEPT



City of Modesto Planning & Community Development Department, City Hall, 11th & H Streeets, Modesto, 577-5267

FIGURE 23

The Pedestrian Pocket is a smaller, more urban village concept, which is built around the idea that residents should be within a quarter-mile walking radius of a transit system. These pockets are only about 100 acres in size compared to Merced's and Modesto's 2,000-acre villages, but will incorporate many of the same ideas. High-density housing, shopping malls and offices are all clustered around a mixed-use core and community center within walking distance of a mass-transit station. Pedestrian Pockets are not meant to be self-sufficient; residents are expected to have to commute to work, school, etc., but will have easy access to mass-transit. This year, Sacramento will be considering a Pedestrian Pocket along one of its light-rail lines. This small-scale "village" would be difficult to develop in Merced because of its reliance on mass-transit, which will not be practical for Merced for many years. It should be noted that Merced's Village Concept is adaptable to mass-transit, but does not rely on it to serve transportation needs. See Figure 24 for a typical Pedestrian Pocket.

SOURCE: Western City, October 1989

FIGURE 24

WHAT THE VILLAGE CONCEPT IS NOT

It is important to distinguish between the self-contained Village Concept and single-purpose suburban business parks since Merced, as it grows, may likely face development pressure to create suburban business parks or industrial areas. The creation of suburban business parks has led to serious traffic congestion problems, affectionately titled "suburban gridlock." This is brought about because of long commutes to and from centers versus short drives within villages. The same can be said about isolated industrial areas.

Current growth trends in the United States, and especially California, have permitted the creation of single-purpose suburban business parks. Sacramento, San Jose and Alameda County all have examples. They are characterized by a campus-style layout, liberally spaced low-lying buildings encircled by a sea of surface parking, and usually liberal landscaping. These work places are pre-ordained for extensive automobile usage. Developers lure firms (particularly high-technology firms) to these parks by emphasizing landscaping, spaciousness and visual amenities. Although they can be very attractive because of their high quality amenities, the traffic problems they create often make them undesirable. These decentralized business parks should not be confused with a "Village Concept" of growth.

The effect of job dispersal on commuting patterns can be striking. Traditionally, American cities have star-shaped commuting paths where commuters would travel to a central business area. Outlying suburban business parks and industrial areas often create chaotic cross-town travel. How this phenomena could occur in Merced is shown below.

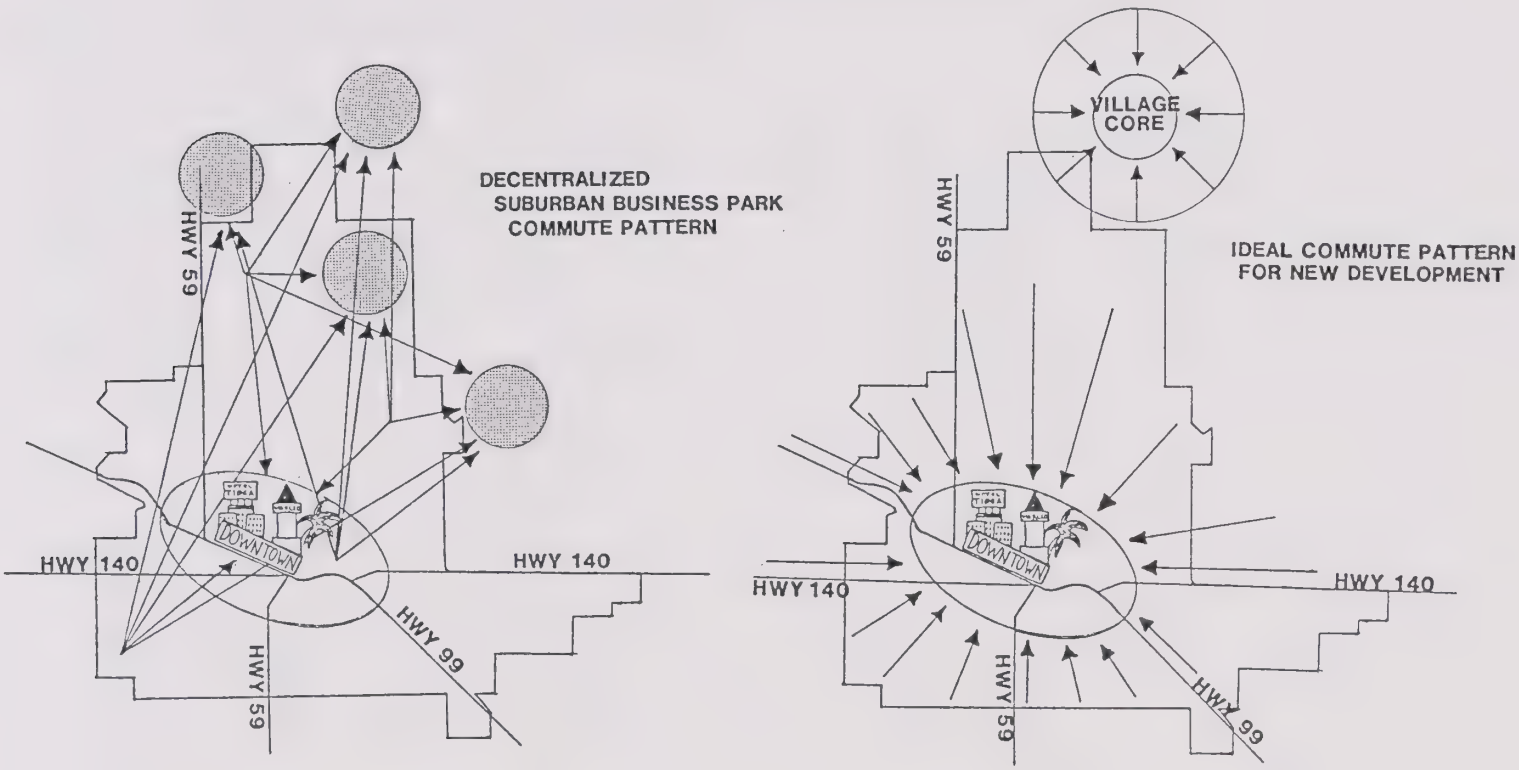


FIGURE 25

In essence, the distinction between villages and suburban business parks, and the antidote to suburban business parks can be summed up as follows:

> "The business park consists of low buildings gobbling up land. What should be built are clusters of buildings and mixtures of office, residential and entertainment in close proximity to one another (Village Concept). The solution is to make suburbs like old-fashioned cities by giving them well-defined centers and buildings located for pedestrians rather than autos (Page 390 of Journal of the American Planning Association, Autumn 1986)."

GUIDING NEW GROWTH AROUND THE VILLAGE

If the village growth concept is adopted, the City will need to utilize some mechanism to control urban expansion around the village unit. A useful approach is the P.I.P. (policy, infrastructure, and politics) principle. This concept is shown and explained below:

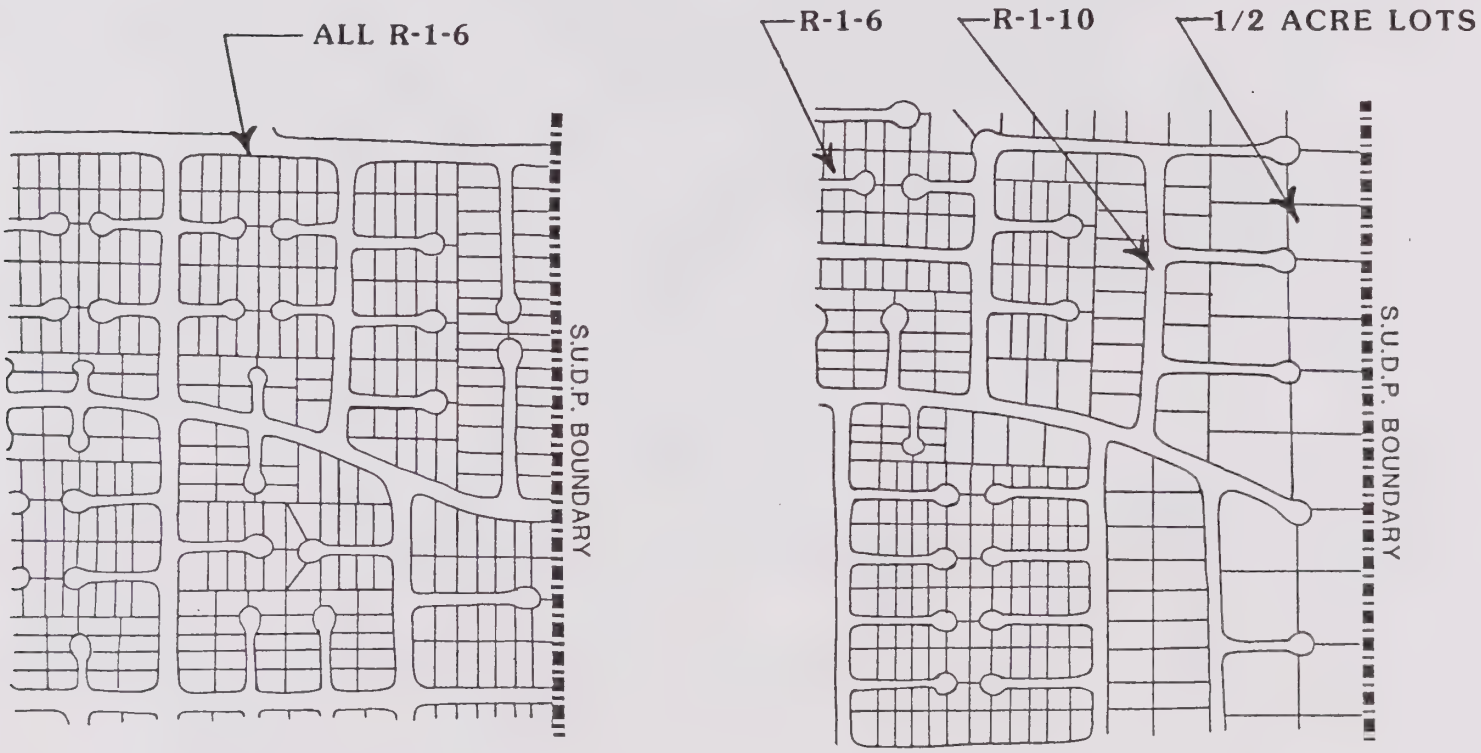


FIGURE 26

1. Policy: Along with adoption of a growth plan, a policy can be adopted to design land subdivisions with large lots at the edge of the city (see the above diagrams). The purpose is to provide an alternative lot and home style opportunity and at the same time a way to help reduce the chances of sprawling beyond designated urban limit lines (SUDP boundaries) into prime agricultural areas.

2. Infrastructure: To discourage growth beyond the urban limit line, major infrastructure is planned to terminate a good distance away from the urban edge. Streets would terminate into cul-de-sacs and sewer and water lines would reduce capacity as they reach the city's edge. For new growth to "jump" the urban limit line, sewer and water lines would have to be enlarged and extended a much greater distance from where the new development would occur -- making fringe area development cost prohibitive to the developer.

3. Politics: Large lot, expensive, single-family residential "estates" are envisioned at the city's edge. For a developer to construct a subdivision outside the city, he would need to request or offer to buy right-of-way from property owners at the end of a cul-de-sac. Such a move would likely be flatly rejected by most property owners, since their properties would likely lower in value due to increased traffic and other negative impacts. Even if the neighbors did not strongly protest, the governing body reviewing the proposal [i.e, Planning Commission, City Council, and the Local Agency Formation Commission (if proposal needed annexation)] would have the policy support and precedence to deny the project.

6 TRAFFIC AND CIRCULATION

MERCED 2030

CIRCULATION CONCEPTS

Currently Merced does not have the transportation problems of major urban areas. However, without bold action, congestion will become common place. We simply cannot continue to expand our present street system which was only designed to handle a City approximately our present size. One of the primary reasons for this 40-year growth study is to determine the street rights-of-way and type of transportation system that would be necessary for a City of 250,000 people. Most cities plan for the next 15 or 20 years, rather than 40 years. Merced, to date, has used 20-year planning horizons. This has led to greatly underestimating our long-term transportation needs. Merced's street system cannot operate at a satisfactory level of service and safety unless we plan for the long-term future.

Any circulation system is concerned with getting people where they want to go - to work, school, shopping, etc. - by whatever means desired - car, bus or train. For the past 50 years, people in the United States have mainly relied on the automobile to serve their transportation needs. Merced for the next 40 years will probably continue to rely mainly on the automobile.

Signalized Arterial/Grid System

Traditionally, American cities were laid out on a grid. All the streets are of equal width and intersections occur at regular intervals. This system allows traffic to be dispersed equally over a large number of streets since any street will eventually get you where you want to go. This system works well for individual neighborhoods and small cities. Central Merced is laid out on such a grid.

Unfortunately, to make this system work for a City of 250,000 residents, many intersections have to be signalized or have stop signs, which interrupts the free-flow of traffic and makes it difficult to get anywhere quickly. Fresno is a good example (Figure 27). Although Fresno's new intracity Freeway 41 helps relieve this situation, it only serves a small part of Fresno. Because of the lack of freeway funding available, Merced should assume there will never be dollars available for Merced intracity freeways and plan accordingly. Therefore, an alternative to Fresno's signalized arterial system must be found.

FRESNO'S TRAFFIC FLOW AND SIGNAL MAP

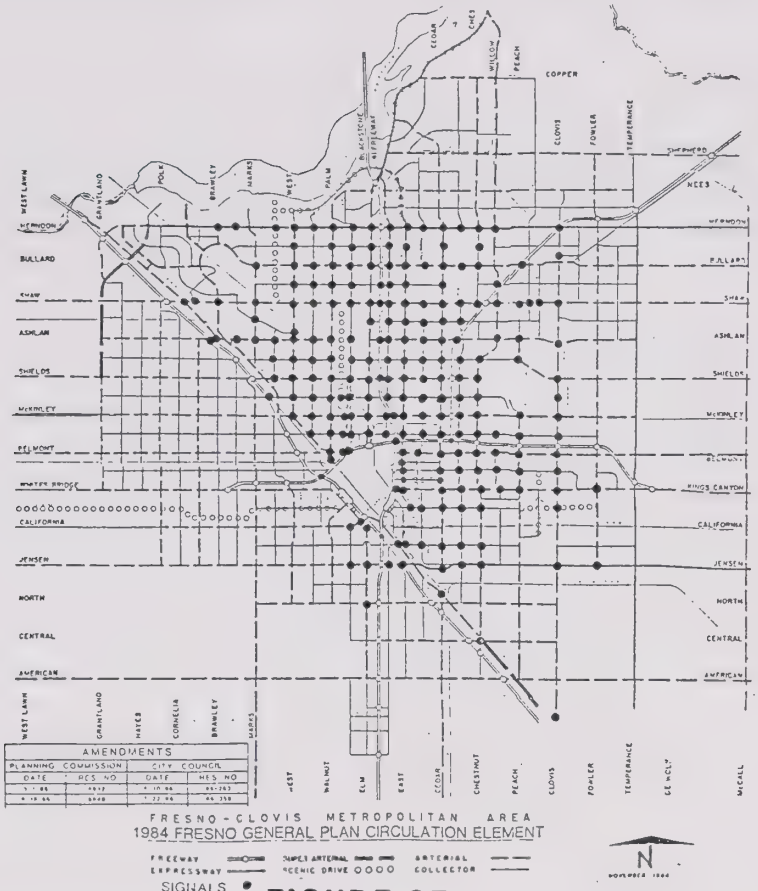


FIGURE 27

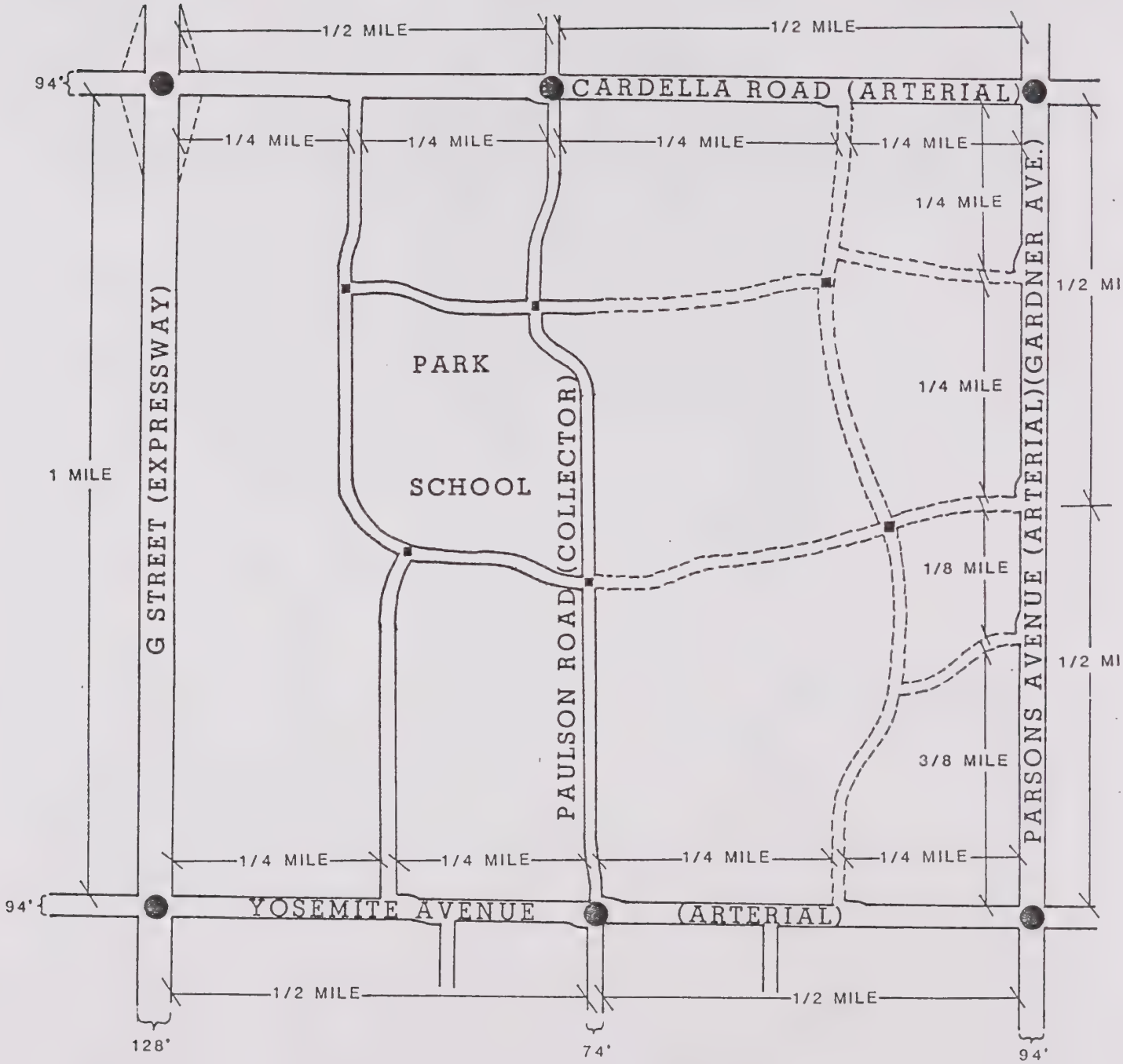
Hierarchy of Streets

In recent years, another system for planning circulation, which involves a hierarchy of street types has been used. These different street types are arranged in a manner (as shown in Figure 28) that directs most of the traffic to the major streets which are equipped to handle it, and keeps residential neighborhoods relatively free of bothersome traffic. These street types consist of, in descending order of size: freeways, expressways, arterials, collectors, and local streets and cul-de-sacs.

Freeways are major routes designed to carry large traffic volumes over long distances. Access is controlled and grade separations and median strips are used to separate lanes of traffic moving in different directions. Through Merced, Route 99 is a four-lane freeway, elevated from about the crossing of Bear Creek on the west through the central part of the City to the intersection of Childs Avenue in the southeast area of the City.

Expressways are roads designed to carry heavy traffic volumes at moderate speeds. Access is controlled, crossings are at grade, and there are usually medians between lanes traveling in opposite directions. Access to abutting properties is restricted to internal streets or frontage roads. The City of San Jose has an extensive expressway system. West Olive Avenue was designed as an expressway although it no longer functions as one because of numerous signalized intersections and multiple driveway cuts.

Arterials are designed to carry heavy traffic volumes at lower speeds than expressways. Some arterials have medians to control cross traffic. The main function of arterials is to accommodate intra-City trips and other medium distance movements, providing the basic transportation links between various



KEY

- Future stop sign locations
- Anticipated signals
- Designated collectors
- future collectors (Outside Specific Plan Area)

NORTHEAST YOSEMITE SPECIFIC PLAN
STREET HIERARCHY

FIGURE 28

land uses and major destinations in the City. Separate turning lanes are usually provided and signals control major intersections. Curb cuts for driveways are located away from intersections and limited to only essential access points. Olive Avenue from 'G" to "R" functions as an arterial as do "G", "M", and "R" Streets south of Yosemite Avenue.

Collector streets are designed to channel traffic from local streets into the major street system and to handle short trips within neighborhoods. They distribute and collect traffic which is generated in the area surrounded by major streets. Speeds are generally low due to pedestrian activity and the frequent access to abutting land uses. Collectors normally have just two lanes of traffic. Examples of existing collector streets include Loughborough Drive, East Alexander Avenue, Brookdale Drive and East 21st Street.

Local streets primarily provide access to destinations within residential neighborhoods or business districts. Local streets include local through streets, cul-de-sacs, and alleys. In residential areas, these are the streets upon which houses front. Therefore, it is important to minimize through traffic to the greatest extent possible by using cul-de-sacs, looped streets, and T-intersections. They should be designed to carry no more traffic than is required to serve the abutting land uses at low speed travel and to permit parking on at least one side.

All the Growth Scenarios were laid out using this method of distributing traffic over a hierarchy of street types.

EXPRESSWAYS/FLYOVERS

Perhaps the most important component of the circulation systems for each of the Growth Scenarios is the "expressway" concept. We have designed an expressway which has three lanes in each direction and sufficient median to allow room in the future for additional lanes or a bus or rail lane, making it a "transitway".

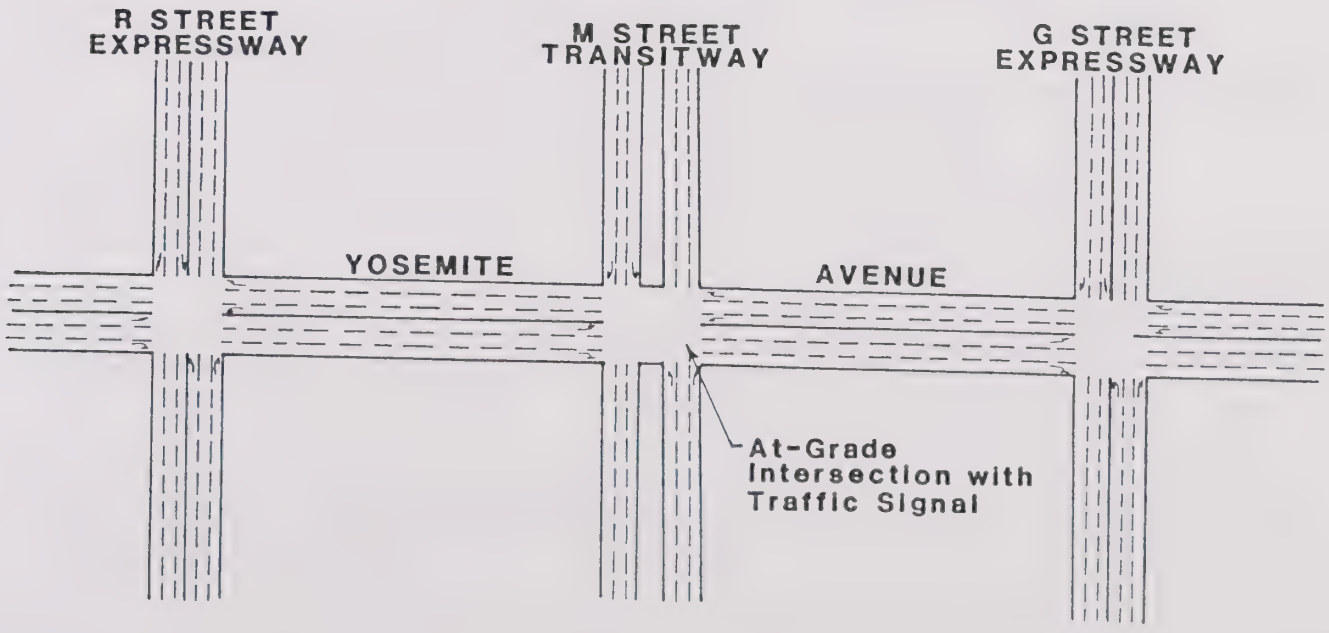
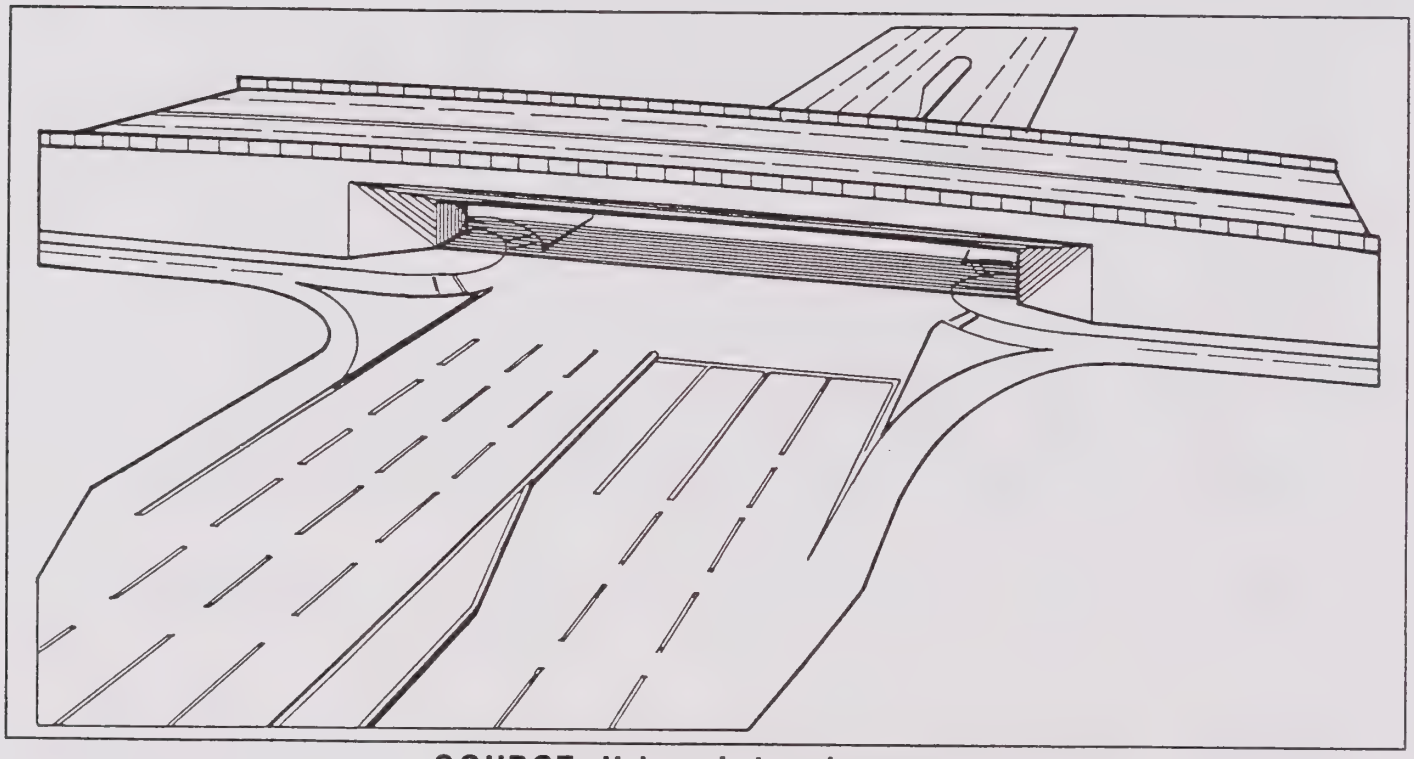


FIGURE 29

The expressway width must also be adequate to convert an expressway to freeway status in the future if "flyovers" or above-ground interchanges are ever desired at intersections. Traffic could then flow in both directions in an unimpeded manner. A conceptual example of a flyover can be seen below.



SOURCE: Urban Interchanges

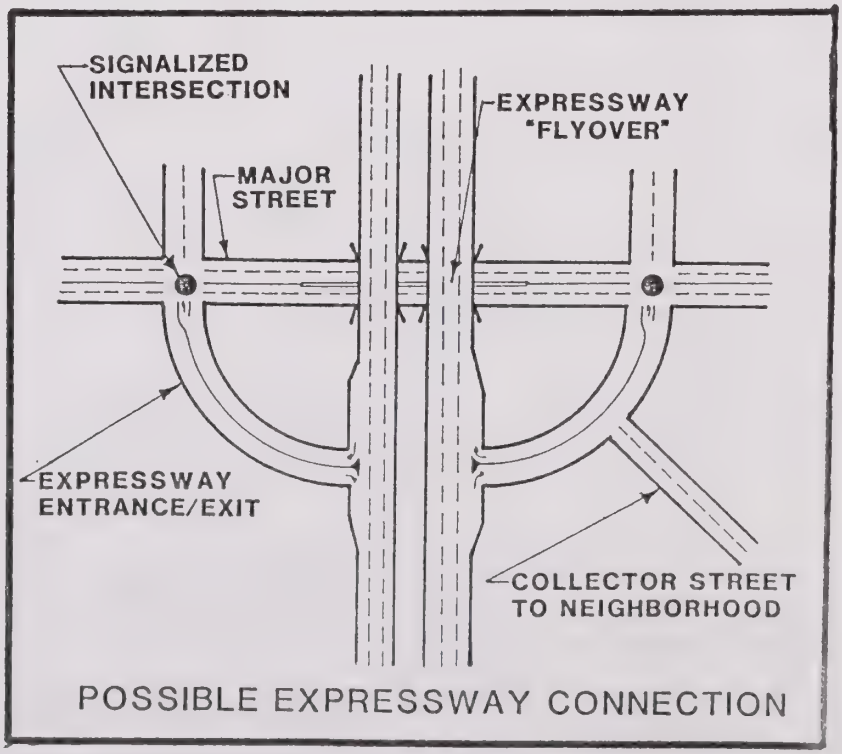


FIGURE 30

In three of the Growth Scenarios, "G", "M", and "R" Streets north of Yosemite Avenue are scheduled to be expressways. Intersections will be spaced one-mile apart and no direct traffic access to the expressways will be allowed between these intersections. Therefore, signalized intersections, which may eventually be converted to flyovers, will come at Cardella, Bellevue, and Old Lake Road (all arterials) as you move north on the expressways. The idea is to allow traffic to flow freely on the expressways in order to carry people longer distances fairly quickly. Land uses adjacent to the expressways will have to access the expressways from one of these arterials, which will have more traffic signals, closer together (usually 1/4 mile), to facilitate access.

Intersection Spacing

This one-mile spacing of intersections brings several distinct advantages. In terms of future planning, it allows the removal of the signal and replacement with a flyover if needed. Signals at one-half mile intervals do not permit this because such flyovers (above-grade crossings) must be about one mile apart in order to allow safe on-and-off traffic movements. We cannot have flyovers at one-half mile intervals for this practical reason, as well as the much higher cost of building twice as many flyovers. Simply removing an existing one-half mile signal when converting to flyovers in the future is not very practical either because (1) you wind up either blocking off streets that have been designed as major collectors or arterials and now are dead-ended, thus creating difficult internal subdivision traffic patterns, or (2) you wind up allowing these collectors to exit onto the expressways with right-turn-only movements into traffic lanes that are already at capacity (loaded bumper-to-bumper) during peak hours.

Another advantage of retaining the one-mile intervals is the substantially improved travel time. Traffic signals are designed to "stop" traffic. A traffic signal at one-half mile intervals will increase travel time at least 25 percent over that allowed by one-mile signals, and that assumes that each car starts forward instantly when the signal turns green. From the staff's perspective, if traffic is going to be bad on "G", "M", and "R" Streets with one-mile intervals between signals on an expressway width street, slowing traffic by an additional 25 percent (with one-half mile signals) is likely to be quite intolerable to the traveling public.

Limiting Access

Another important component of an expressway is limited access. In order for an expressway to function most efficiently, no access (driveway cuts) must be allowed from adjacent land uses, such as fast food restaurants, mini-marts, etc. Any driver who travels down Olive Avenue or "G" Street knows how much he has to slow down in order to allow the car in front of him to turn into a driveway. Multiply that tenfold with multiple driveway cuts and heavy traffic, and you will realize how much allowing access to expressways from adjacent land uses will slow down traffic. Since the idea behind expressways is to carry large volumes of traffic long distances in a short amount of time, allowing driveway access to expressways defeats the whole purpose of expressways.

What makes an expressway work at maximum efficiency in moving traffic is that signal distances are at the maximum feasible, no access is allowed from adjacent land uses (such as fast food restaurants, mini-marts, etc.), and a sophisticated signal system allows prioritizing the "green" time to better facilitate the flow of traffic on the more-heavily traveled roads. The latter particularly is more difficult as the number of signals to be interrelated increases and the distance between signals decreases.

TRAFFIC ANALYSIS

In order to understand the basic assumptions that were made in analyzing the circulation systems of the various Growth Scenarios, it is necessary to define some terms.

Level of Service

Level of Service (LOS) quantitatively describes the operating conditions encountered on streets. LOS ranks street operations based on the amount of traffic and the quality of traffic movement on a scale of A through F. Level A represents free-flow conditions and Level F represents traffic jams or streets with more traffic than they have room for (see Figure 31 for a graphic illustration of the various Levels of Service). Level of Service is influenced by a number of factors: existence of on-street parking, frequency and spacing of traffic signals, number and frequency to intersecting side streets and curb cuts, pedestrian activity, and existence of left- and right-turn pockets.

Generally, Level of Service A describes primarily free-flow operations. Vehicles are almost completely unimpeded in their ability to maneuver. Level A is what we could experience on a free-flow roadway without any interruptions (i.e., cross streets, signals, driveway openings, etc.) - an expressway with flyovers during non-peak traffic hours.

Level of Service B also represents reasonably free-flow conditions. The ability to maneuver is only slightly restricted, and the general level of physical and psychological comfort provided to drivers is still high. The effects of minor incidents and breakdowns are easily absorbed.

Level of Service C provides for stable operation, but flows approach the range in which small increases in flow will cause substantial deterioration in service. Freedom to maneuver is noticeably restricted and lane changes require additional care and vigilance by the driver. Minor incidents may still be absorbed, but queues may be expected to form behind any significant blockage. The driver now experiences a noticeable increase in tension due to the additional vigilance required for safe operation. Level C is what the City of Merced currently experiences on a day-to-day basis, excluding the three short peak periods at 8:00 a.m., noon and 5:00 p.m.

Level of Service D borders on unstable flow. In this range, small increases in flow cause substantial deterioration in service. Freedom to maneuver is severely limited, and the driver experiences drastically reduced comfort levels. Even minor incidents can be expected to create substantial queuing because the traffic has little space to absorb the disruptions. Level D is what

LEVEL OF SERVICE

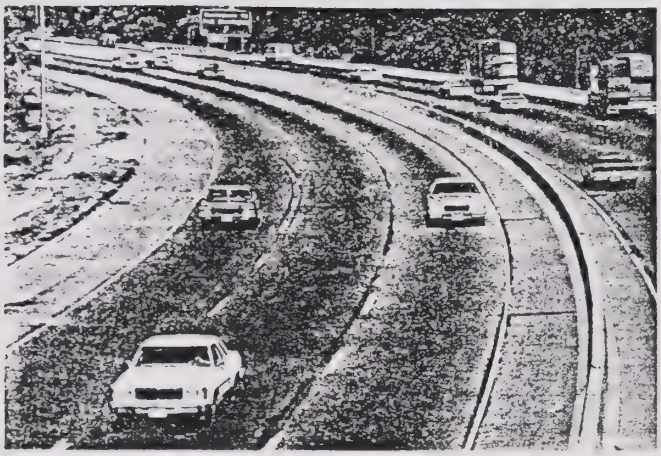


Illustration Level-of-service A.

Illustration Level-of-service D.

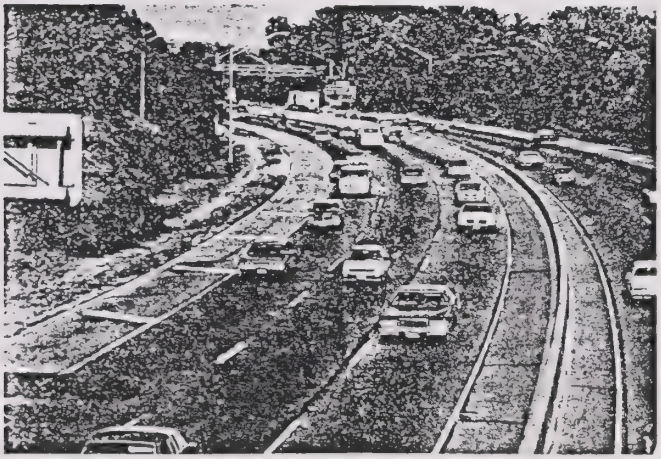


Illustration Level-of-service B.

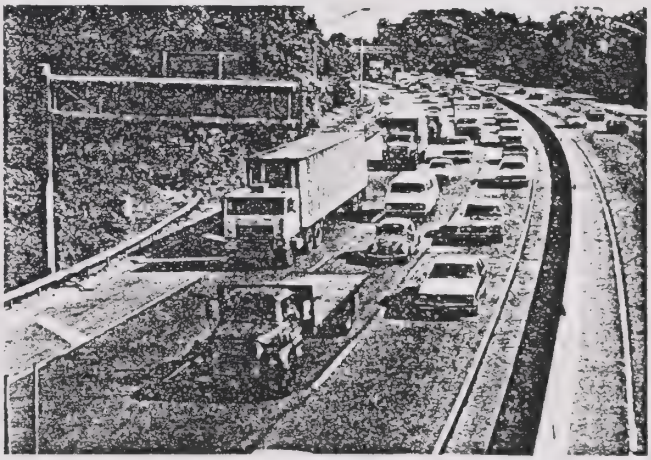


Illustration Level-of-service E.

Illustration Level-of-service C.

Illustration Level-of-service F.

SOURCE: Highway Capacity Manual

FIGURE 31

is currently experienced at the intersection of "G" and Bear Creek for the short period of heavy traffic around 5:00 p.m. each work day.

Level of Service E describes operation at capacity. Operations in this level are extremely unstable because there are virtually no usable gaps in the traffic stream. Any disruption in the traffic stream, such as a vehicle entering from a ramp or a vehicle changing lanes, causes following vehicles to give way to admit the vehicle. Any incident can be expected to produce a serious breakdown with extensive queuing. Maneuverability is extremely limited, and the level of comfort afforded to the driver is extremely poor.

Level of Service F describes bumper-to-bumper traffic with no continuous flow, virtually no maneuvering room, and causes serious stress in the driver. Level F is a gridlock condition caused by many traffic interruptions. Gridlock might be compared to "G" Street at 5:00 p.m. with a train crossing delay or a sports event exiting the college or high school.

Assumptions/Analysis

Our traffic analysis is based on the assumption that City residents want to continue with a Level of Service C. Level C has therefore been used to calculate the capacity (number of lanes) required in the proposed new villages for each Scenario to maintain that Level C. It must be noted, however, that in some of the existing areas, retrofitting to a Level of Service C is neither practical, nor feasible, due to the cost and right-of-way constraints, and therefore, a lower level of service must be "accepted" or "tolerated".

The capacity of the street is determined by calculating the number (volume) of cars that will be generated by adjacent land uses at the "critical peak hour" (the time when the most cars will be on the road--usually between 4 and 6 p.m.). The volume of cars is then distributed over all the streets available in the area using various factors such as desired destinations, the classification of roadways, etc., and from that the number of lanes needed to serve those volumes at a certain level of service is determined.

Using this methodology, City staff and an outside consultant evaluated the Growth Scenarios described in the next chapter, and concluded that there could be enough capacity to maintain a Level of Service C in the new village areas, with a few minor exceptions--notably in Scenarios I and III. (See Merced 2030 - How Should We Grow?: Technical Appendices for further details.) However, the Level of Service in the existing areas of the City will likely drop to Levels E or F if no new lanes are added. Adding new lanes will be difficult since existing homes and businesses will likely have to be moved. Think of all the problems associated with the still-uncompleted East Olive Avenue widening and the upcoming Parsons Avenue project to get an idea how difficult and costly retrofitting existing areas can be. This will make the achievement of the Village Concept even more vital so that residents will be able to obtain most needed services in the village and not have to encounter these traffic conditions daily. The completion of alternate routes around the Central City, such as the planned connection of Yosemite Avenue to Highway 99 already in our General Plan, also become even more important. The State Highways 99, 59 and 140 will also need to be widened and improved.

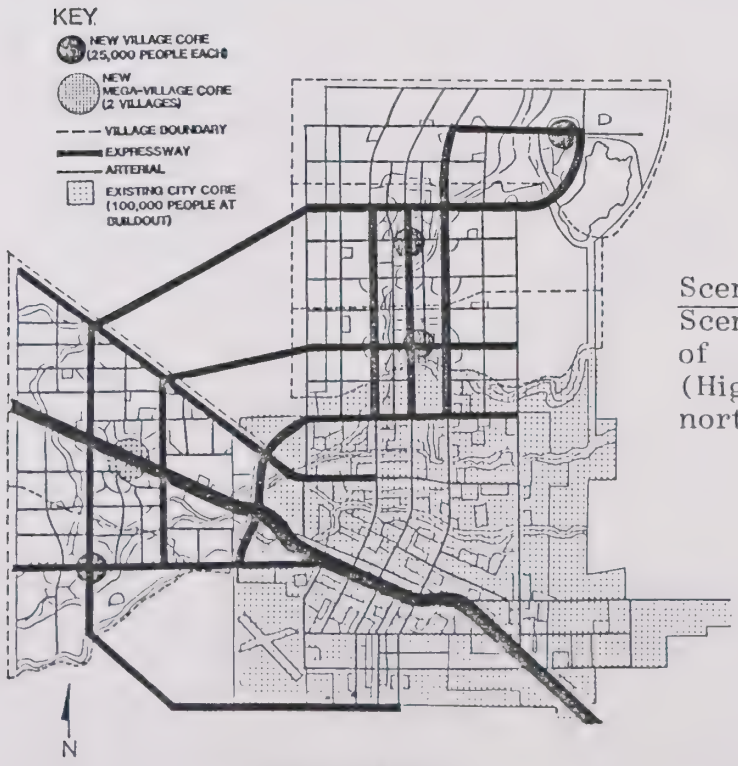
7 GROWTH SCENARIOS

MERCED 2030

In the previous sections, the possible growth concepts for new development in the City of Merced were discussed and a rationale was given for using the Village Concept. The Village Concept, simply defined for this report, is a relatively self-contained community with a mixture of land uses and total population of approximately 25,000 people. The question now becomes: How do we geographically structure the villages to minimize cost, minimize traffic congestion, maximize livability, and minimize environmental impacts? Staff has conceptually designed villages into four possible Scenarios, as shown below. A fifth Scenario that makes little attempt to guide new development is also an option.

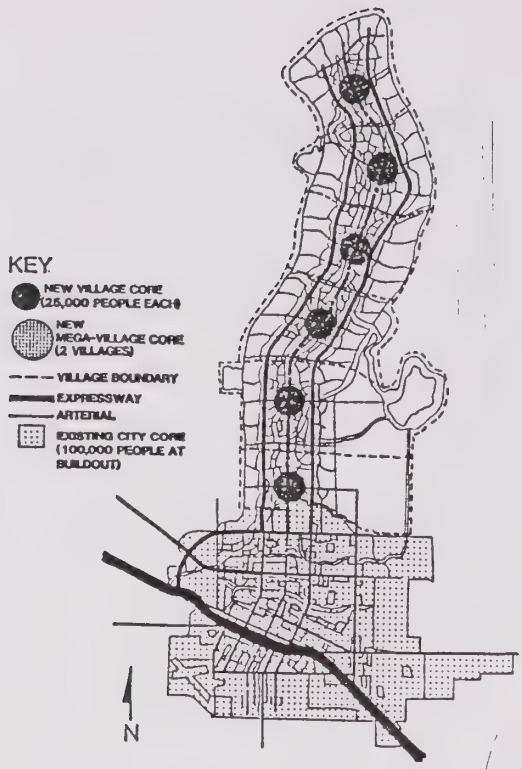
As you review each Scenario, it should be clear that Merced's future growth pattern can instead be like either the Sprawling City (urban sprawl) or Central City model (bedroom communities supporting a higher intensity central city). But, if either of these underlying models are chosen instead of the Village Concept, additional traffic lanes will need to be added to handle the greater cross-town traffic volumes that will result.

The five Growth Scenarios were selected after reviewing current development trends in the City of Merced, trends that have occurred elsewhere in the Central Valley (i.e., Fresno and Modesto), and areas of potential development around Merced which have few growth constraints. Modifications in each are certainly possible but we feel future growth in Merced, with or without growth management policies, will follow one of these five basic scenarios.



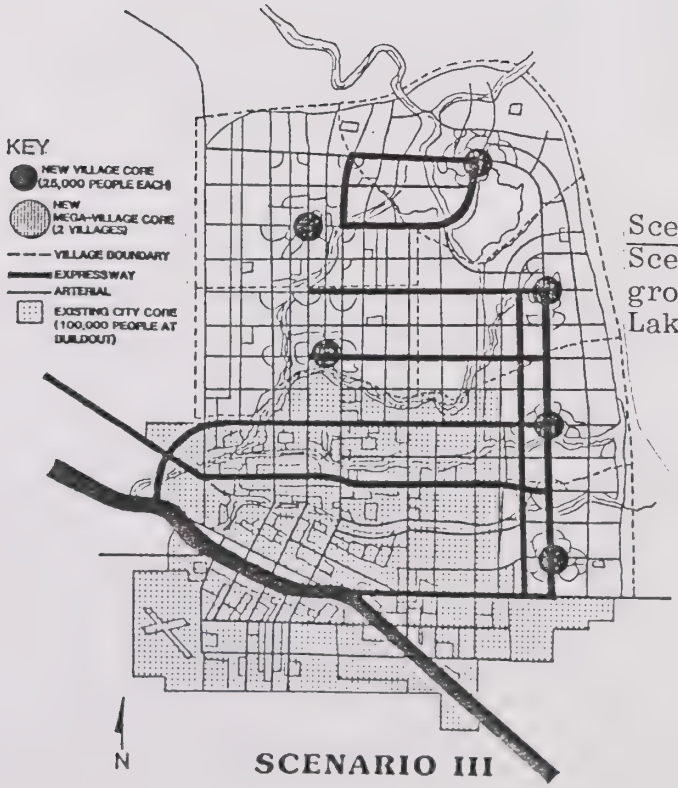
SCENARIO I

Scenario I ("Western City") - Growth Scenario I shows a westerly growth south of Santa Fe Drive to McSwain Road (Highway 140) towards Atwater and some northerly expansion.



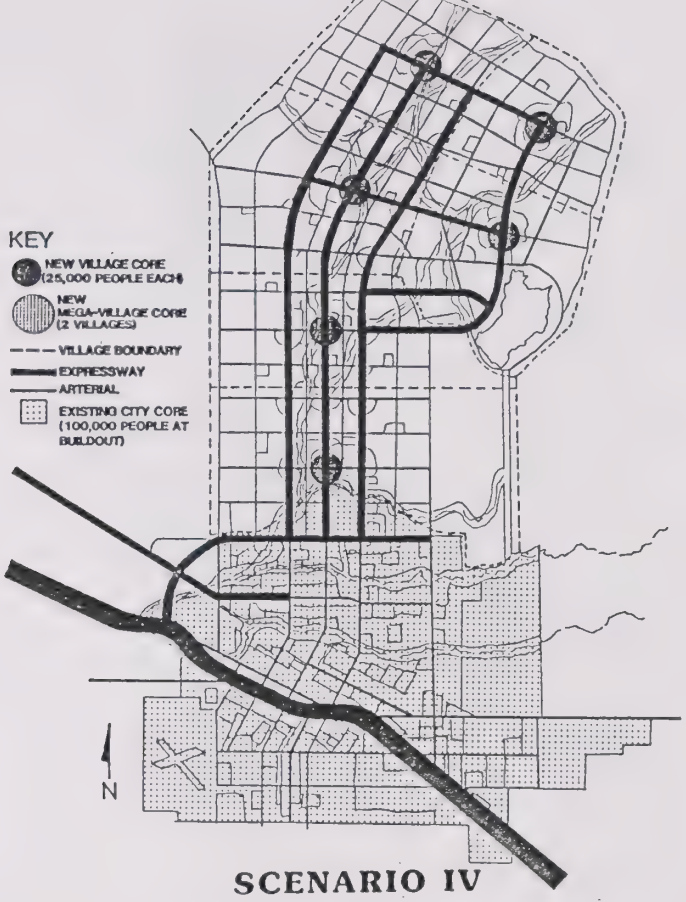
SCENARIO II

Scenario II ("Linear City") - Growth Scenario II shows a considerable northern growth beyond the SUDP in a linear pattern. The six new "villages" would be aligned and connected by the "G", "M", and "R" Street expressways.



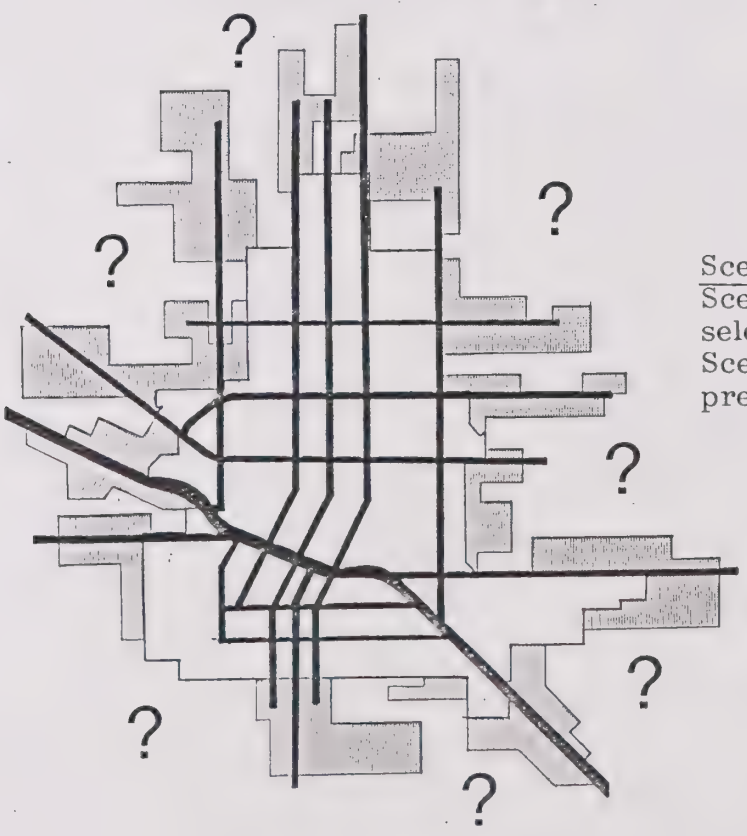
SCENARIO III

Scenario III ("Eastern City") - Growth Scenario III envisions major easterly growth with some northern growth around Lake Yosemite.



SCENARIO IV

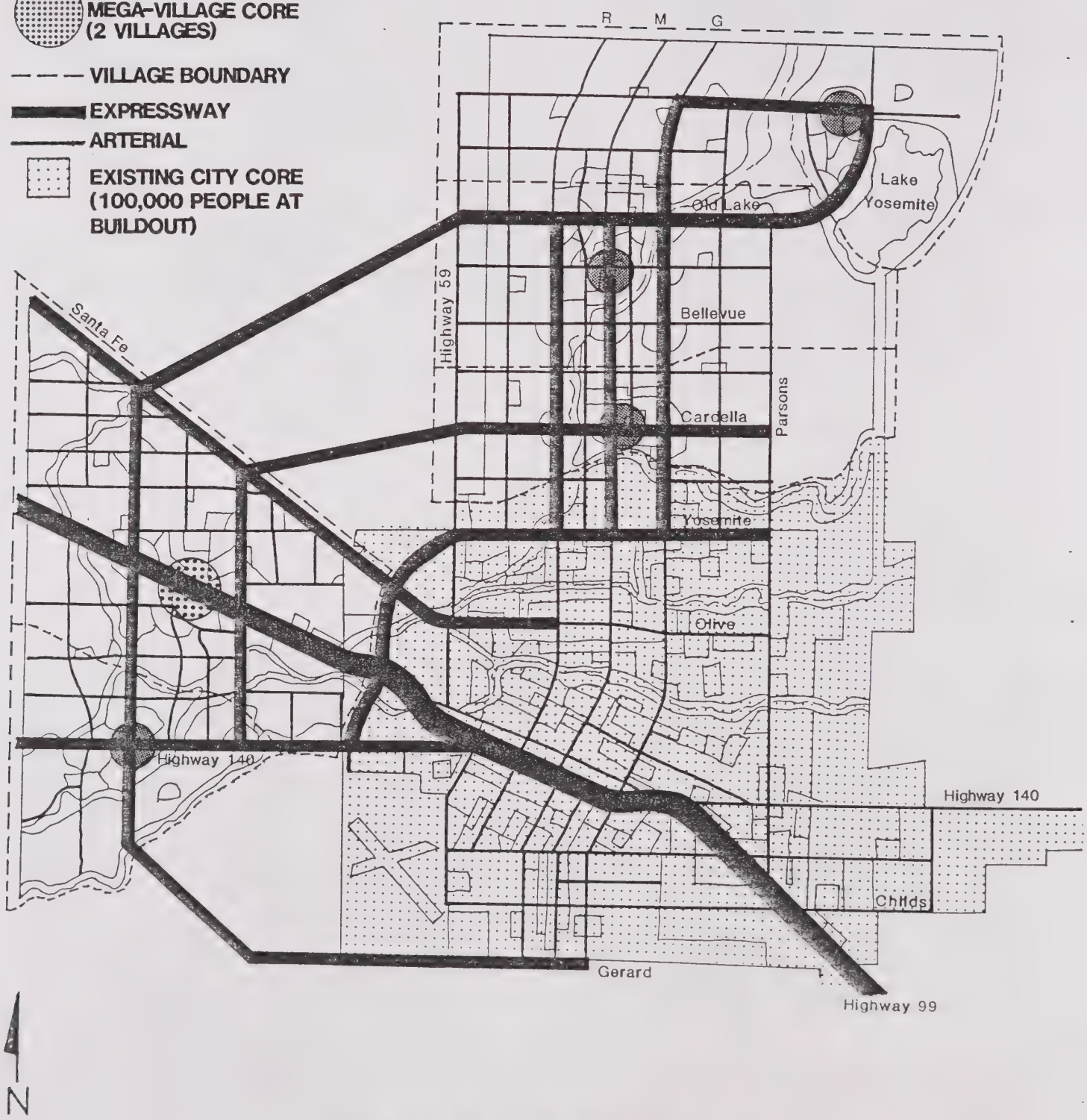
Scenario IV ("Northern City") - Growth Scenario IV assumes a northward growth pattern with four villages near Lake Yosemite.



SCENARIO V

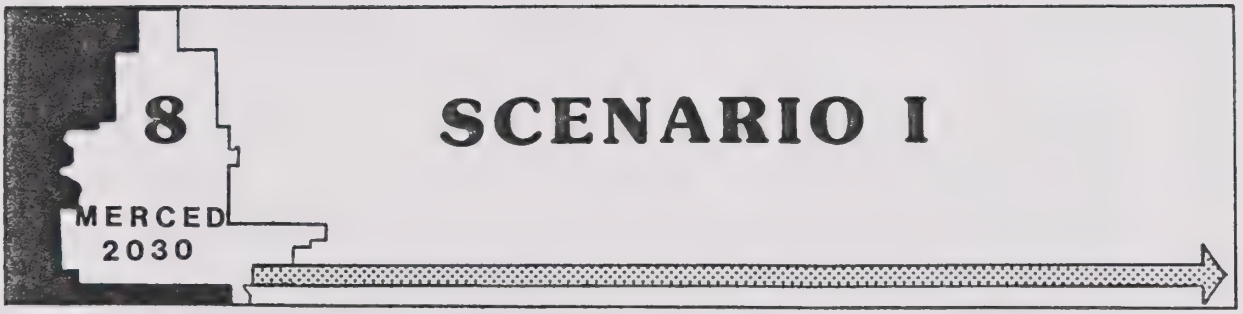
Scenario V ("Do Nothing") - Growth Scenario V is the option that would be selected by default if none of the Scenarios is selected. It is impossible to predict its shape.

This report discusses the advantages and disadvantages of each Growth Scenario, as well as the anticipated circulation impacts and implementation costs. Descriptions of each Scenario and rationales for their selection follow.



SCENARIO I

FIGURE 32



SCENARIO I

DYNAMICS

Scenario I exhibits westerly growth south of Santa Fe Drive to McSwain Road towards Atwater, as shown on the opposite page. The dynamics of growth in this direction are discussed in terms of geography/land use, sewer serviceability, water provision, circulation, bridges and signals, and livability advantages and disadvantages.

1. Geography/Land Use.

   Scenario I has the equivalent of three villages west of the current downtown center. One is a "mega village" with an estimated population of 50,000, extending to the Atwater City limits and centered on the freeway (Highway 99). The other is a standard village of 25,000 centered at the intersection of Buhach and Highway 140. The remaining three villages extend northerly towards Lake Yosemite.

2. Sewer

   Sewer expansion for this Scenario is divided between northern growth and western growth (two growth centers). Three new pump stations might be needed to carry sewage to the existing City sewer plant. This assumes the present Franklin-Beachwood sewer system, now serving approximately 3,000 people cannot be expanded to serve 30-40,000 additional people in the area north of Highway 99. Of the four Scenarios, this is the second least expensive sewer service to build (see cost comparison, Appendix A); this is due in part to the close proximity of development to the plant and less pipe needed to carry sewage.

3. Water

   Water distribution is based on standard 16-inch mains on a one-mile square grid. Like the other Scenarios, it relies on wells. It is the second least expensive system to construct (see Appendix A for Cost Summary).

4. Circulation

   This Scenario is able to utilize Santa Fe Drive, Highway 99 and Highway 140 as expressways to facilitate inter-city transportation. Three additional north/south expressways connect Santa Fe Drive to Highway 140. The northern extension of M, G, and R Streets expressways serve the three villages to the north. This Scenario is the second least expensive for traffic improvements (see Appendix A for traffic cost summary). Since implementation of this Scenario utilizes three existing east/west streets (Santa Fe, Yosemite, and Highway 140), it is reasonably cost-effective.

5. Bridges and Signals

Bridge costs for Scenario I are the highest of the four Scenarios. Implementation of an efficient circulation system for this Scenario requires crossings/multiple crossings on Bear Creek, Canal Creek, South Slough, Black Rascal Creek and Fahrens Creek, etc.

Based on 250,000 people, 189 proposed traffic signals are anticipated, which works out to 0.76 signals per thousand people. This figure indicates that it would be the second least costly Scenario to implement for signals (see Appendix B for Signal Comparison) and would be comparable to Modesto in terms of traffic signal density.

ADVANTAGES

The advantages of this Scenario include the following:

1. The westerly growth and northern growth are generally closer to the downtown, thus keeping downtown Merced centralized.

2. Since the sewer plant is located south of the present City, the westerly growth would have good access to the sewer plant and, therefore, it would be less-costly to provide sewer.

3. Growth is directed away from the Castle Air Force Base flight path.

4. Merced urban services are made more accessible to Atwater and Franklin/Beachwood residents.

5. The industrial parks are centrally located.

6. Although the agricultural uses are important in this Scenario, the soils that the Scenario is built on are not as prime as other soils, especially to the east of the present City limits.

7. Growth is in a direction where some growth has already occurred.

8. The park system in the area south of Santa Fe Drive would utilize Bear Creek South Slough and Canal Creek, allowing for a reasonably good park and bikeways system. However, the building and maintenance cost of such a system could be burdensome to the City if development fees are not adjusted accordingly.

9. This Scenario provides a greater number of residents, easy access to Highway 99.

DISADVANTAGES

The following disadvantages were noted with this Scenario:

1. North and west development hampers ease of circulation between village centers and will necessitate more cross-town trips through the downtown area.

2. Pressure to infill the area west of Highway 59 and north of Santa Fe Drive would occur. Such development would be in the Castle Air Force Base flight path, subjecting businesses, residents and the public to unacceptable noise levels, vibrations, and higher jet fuel fumes. In the event of a plane crash, an area in the flight path has a high probability of suffering heavy damage and loss of life. Further, it is important that we follow the Castle Land Use Compatability Plan we just adopted in order to protect against Castle closing because of urban development intrusion.

3. Undesirable growth south towards the City's municipal airport clear zones would occur.

4. Freeway commercial sprawl from Atwater to Merced along Highway 99 could result in a long string of commercial freeway uses such as gas stations, fast food restaurants, and motels, thus making the Village Concept harder to implement since commercial growth would not be centralized in the villages.

5. Valuable, irreplaceable agricultural land (west of present-day Merced) would be lost.

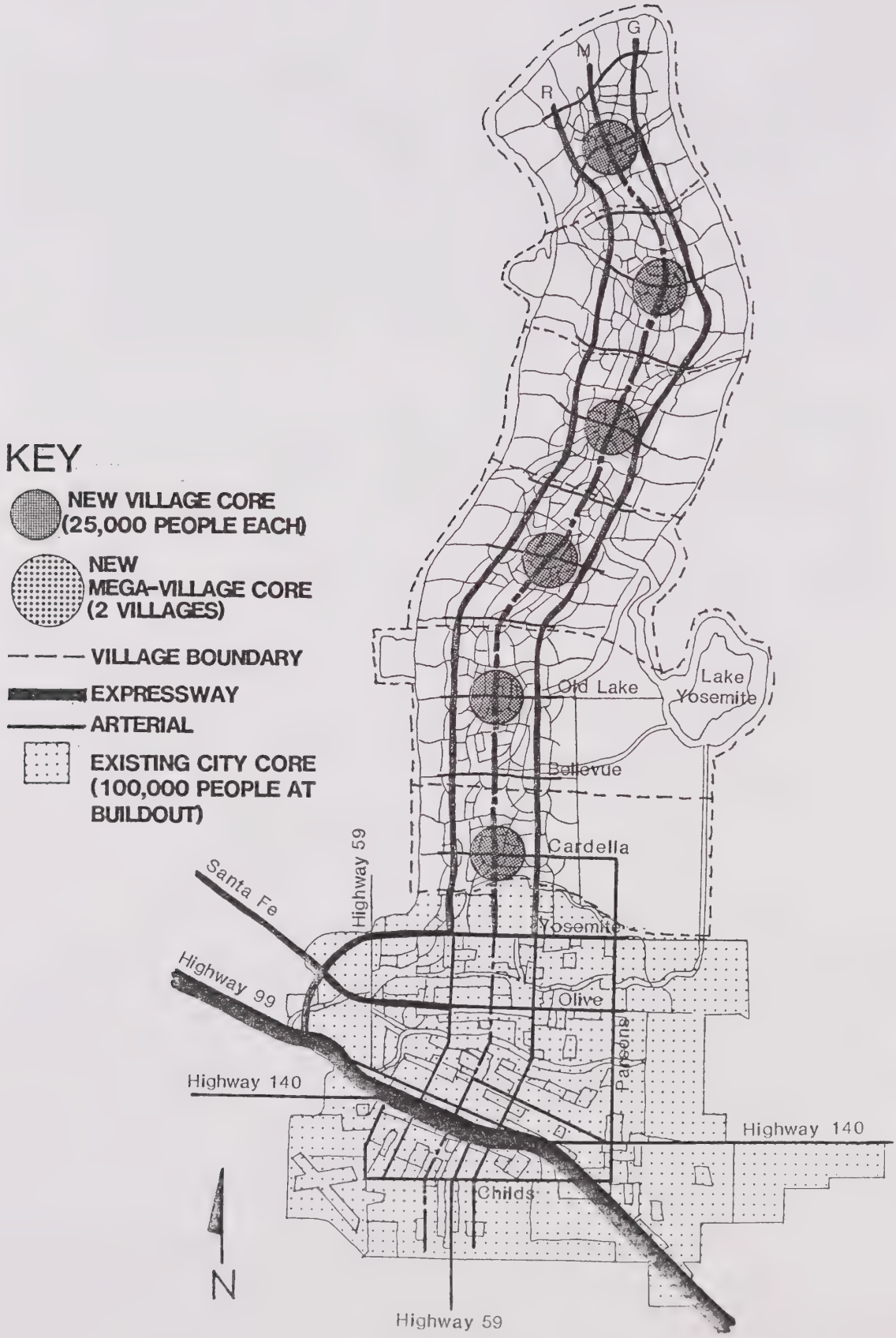
6. Growth would take place in a flood prone area to the west of the present City limits.

7. This is the most costly Scenario in terms of providing public facilities (Appendix A).

8. This Scenario would heavily impact existing County roads, especially Santa Fe Drive, and the Franklin/Beachwood area.

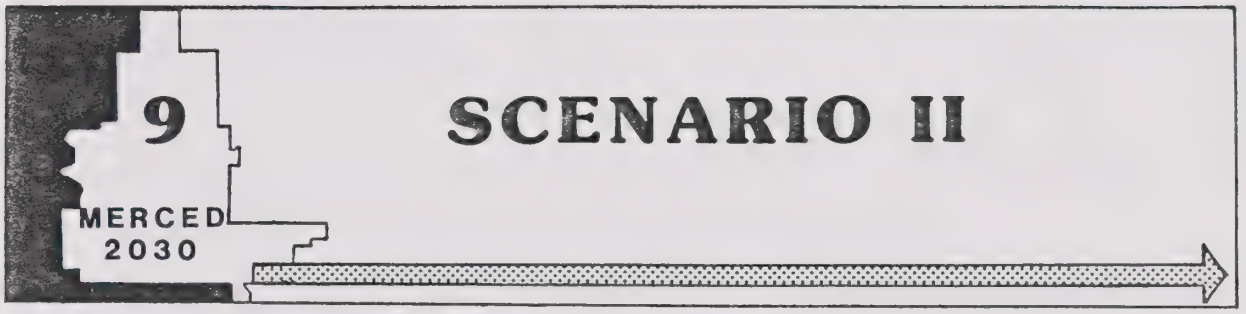
SUMMARY

Scenario I is reasonable in terms of livability and access to downtown, but is less efficient in regards to traffic circulation and the overall cost of providing the necessary public improvements and services. This Scenario also intrudes on some of the environmentally-sensitive areas such as western agricultural land and flood-prone areas.



SCENARIO II

FIGURE 33



SCENARIO II

DYNAMICS

Scenario II calls for growth within the present SUDP, then directly north. The six villages would be aligned and connected by "G", "M" and "R" Street expressways.

1. Geography/Land Use

This Scenario is directed away from prime agricultural lands. Each of the six villages in this Scenario extend due north past Lake Yosemite and are connected by the G, M, and R Street expressways. Arterials are at one-mile intervals, beginning with Yosemite Avenue, Cardella Road, Bellevue Road, and Old Lake Road. The presence and lure of the hills provides an impetus for development.

2. Sewer System

This Scenario uses the naturally higher typography north of Merced to allow for a gravity-fed sewer system. The main sewer line extends down R Street with minor trunk lines extending to the line. Having one north/south gravity-fed line provides for low cost, efficient service. A new pump station to the extreme north is needed to pump sewage over the hill. This is the second-most expensive sewer system to implement. (See cost comparison in Appendix A.)

3. Water

Water for this Scenario is distributed with 16-inch pipes on a one-mile grid with 12-inch pipes at half-mile points for fire flow. The main water source would be from wells. This alternative allows for easy access to surface water from the Merced River, if needed. Large tank storage utilizing hilltop locations could also be possible.

4. Circulation

Growth Scenario II would maintain a strong hierarchy of roads for ease of traffic movement with north-south expressways at approximately half-mile intervals (G, M, and R Streets) and east-west arterials at one-mile intervals. It would be the least expensive traffic system to implement (see Appendix A) largely due to the low number of signalized intersections needed (Appendix B).

"M" Street could be a possible transitway for light rail, buses, or some future form of mass transit. The village design would allow access to this transitway.

The expressways are intended to be intersected by major east-west arterial streets only, with access limited to a distance of a minimum of one mile to be effective in carrying large volumes of traffic quickly. There could also be some form of overpass/underpass (flyover) at these intersections which would allow free-flow (no signals) for expressway traffic. (Sufficient right-of-way might be obtained to make this option possible in the future.)

5. Bridges and Signals

Scenario II is the least expensive to implement for bridges since there are fewer water features to cross to the north (see Appendix A for bridge cost comparison.)

The anticipated number of signals needed to implement this Scenario is 138 (based on 250,000 people), or .55 per one thousand people. This is 51 fewer than the next lowest Scenario (Scenario I) and 72 fewer signals than the Scenario with the greatest number of signals (Scenario III). (See Appendix B, Signal Comparison.) Naturally, the fewer signals needed affords travelers ease of traffic movement, reducing in-town travel times, and is less expensive to construct and maintain.

ADVANTAGES

The following advantages make this Scenario a viable alternative:

1. Travel between villages for residents is efficient and convenient. The "G", "M" and "R" Street expressways connect all the village cores and lend themselves to the easy provision of public transit.

2. This Scenario avoids the Castle Air Force Base flight path and associated hazards.

3. This Scenario would preserve prime agricultural soils to the east and west, with development occurring on less fertile soils to the north.

4. The development potential of the low lying hills to the north could be utilized, offering a high level of developer attractiveness.

5. This Scenario avoids flood-prone areas to the south, east and west.

6. More people are within close proximity to open space than in any other Scenario. This gives residents a more rural feeling.

7. The costs of providing services are the lowest of any of the Scenarios.

8. This Scenario would have the least impact on existing County facilities, such as roads, the rural residential centers, and Lake Yosemite.

DISADVANTAGES

The following disadvantages were noted with this Scenario:

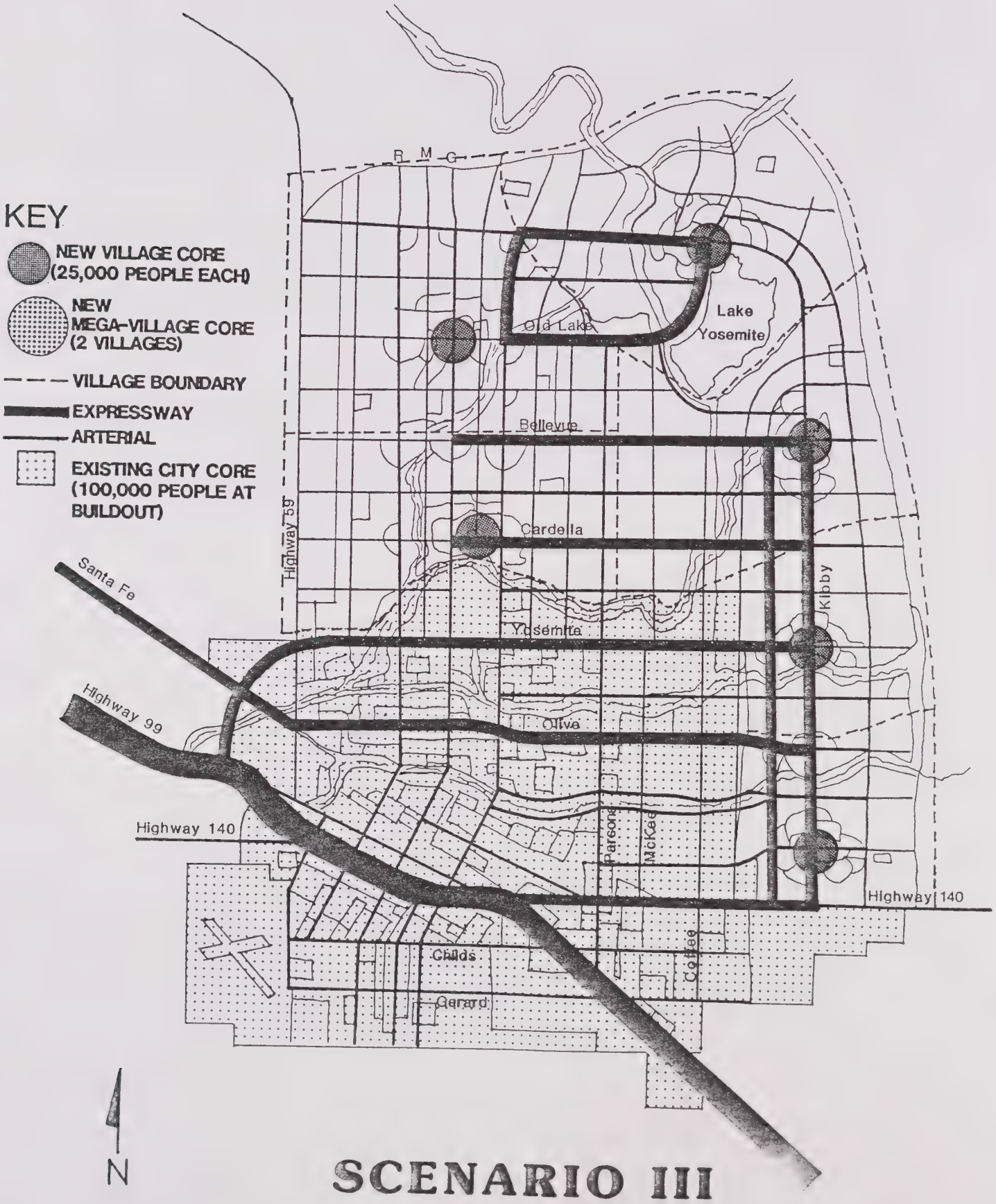
1. Extreme northern growth in this Scenario is not convenient to Highway 99.

2. Holding east/west growth boundaries could be difficult, requiring strong land use policy and City/County cooperation.

3. Downtown is less centralized to the northernmost villages. However, the expressways should save overall travel time even if the travel distance is greater.

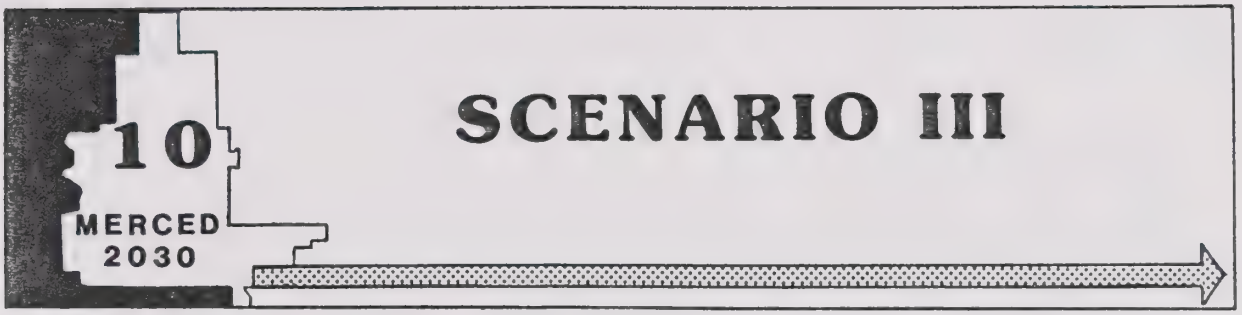
SUMMARY

Scenario II's advantages include a high degree of livability, a simple, well-defined, efficient circulation system (e.g., the "G", "M" and "R" Street expressways), low cost of service delivery and a close proximity to open space adjacent to each of the villages; but Scenario II's extreme northern growth is inconvenient to Highway 99 and holding its east/west boundaries may be difficult.



SCENARIO III

FIGURE 34



SCENARIO III

DYNAMICS

Scenario III envisions an easterly growth pattern as shown opposite. This Scenario could occur because there are minimal physical restraints to the east. The type of growth suggested in this Scenario is representative of other growing valley towns. This Scenario closely resembles the build-out size and shape of Modesto and Fresno, as shown in Appendix B.

1. Geography/Land Use

   Scenario III assumes northern growth out to the existing SUDP with the development of two villages to the north and then gradual concurrent development pressure eastward. While growth extends northward, County rural residential development is expected to continue developing along the current eastern SUDP boundary.

   Four villages would grow to the east parallel to current and proposed northern expansion. This growth would begin as soon as services are extended east through the rural residential area.

2. Sewer

   The main sewer lines would extend along Coffee Avenue, Gerard Avenue, Old Lake Road, and R Street/Highway 59. The main expense of this sewer expansion is the cost of a second parallel line on Coffee Avenue/ Gerard Avenue. (See Cost Summary - Appendix A)

3. Water

   Water mains are 16 inches on one-mile grids with 12-inch mains at half-mile intervals. Due to the sheer area of land to be served, the cost of water provision is the most costly of the four Scenarios.

4. Circulation

   The circulation system for this Scenario utilizes a basic grid pattern. There are five major north/south expressways/arterials and eight major east/west expressways/arterials. Bear Creek Drive and East 21st (both Scenic Corridors) would be heavily impacted by large volumes of traffic. They would be used because of the limited number of east/west streets. This would be the second most costly circulation system to build.

5. Bridges and Signals

This Growth Scenario has the second lowest total cost for bridges. Bridges would be needed on Bear Creek and the northern creeks.

This Scenario has the greatest number of signals per one-thousand people. It is approximately the same as Modesto (see signal comparison and map of Modesto in Appendix B). The number of signals needed for a grid system is greater because vehicle trips are more dispersed, which leads to localized traffic slow-downs. The number of signals needed per 1,000 people is 0.84 (based on 250,000 people), which is slightly less than Modesto with 0.89 signals per 1,000 people.

ADVANTAGES

The advantages to growth in this direction include:

1. Relatively easy access to Highway 99 for all residents is maintained.

2. Lake Yosemite is more a part of the City with this Scenario.

3. The southeastern-most village will provide easy access to the City's heavy industrial area.

DISADVANTAGES

The following disadvantages were noted with this Scenario:

1. This Scenario would be built on prime agricultural lands.

2. This Scenario is the second most costly in terms of public facilities and services to implement.

3. There is no central focus. The layout could easily result in typical urban sprawl.

4. Traffic congestion is expected to be significant.

5. Lake Yosemite's character would likely be changed, and County facilities at the lake could be severely impacted.

6. The travel patterns of residents would be very dispersed, which would mean more traffic congestion.

7. This Scenario would be built adjacent to areas east of the current SUDP designated as County rural residential centers, thus eliminating their function as buffers between the City and agricultural land.

SUMMARY

Scenario III has easy access to Highway 99 and the City's heavy industrial area, but the typical urban sprawl of this Scenario would result in the loss of prime agricultural land and heavy traffic impacts, and would be very costly to implement.

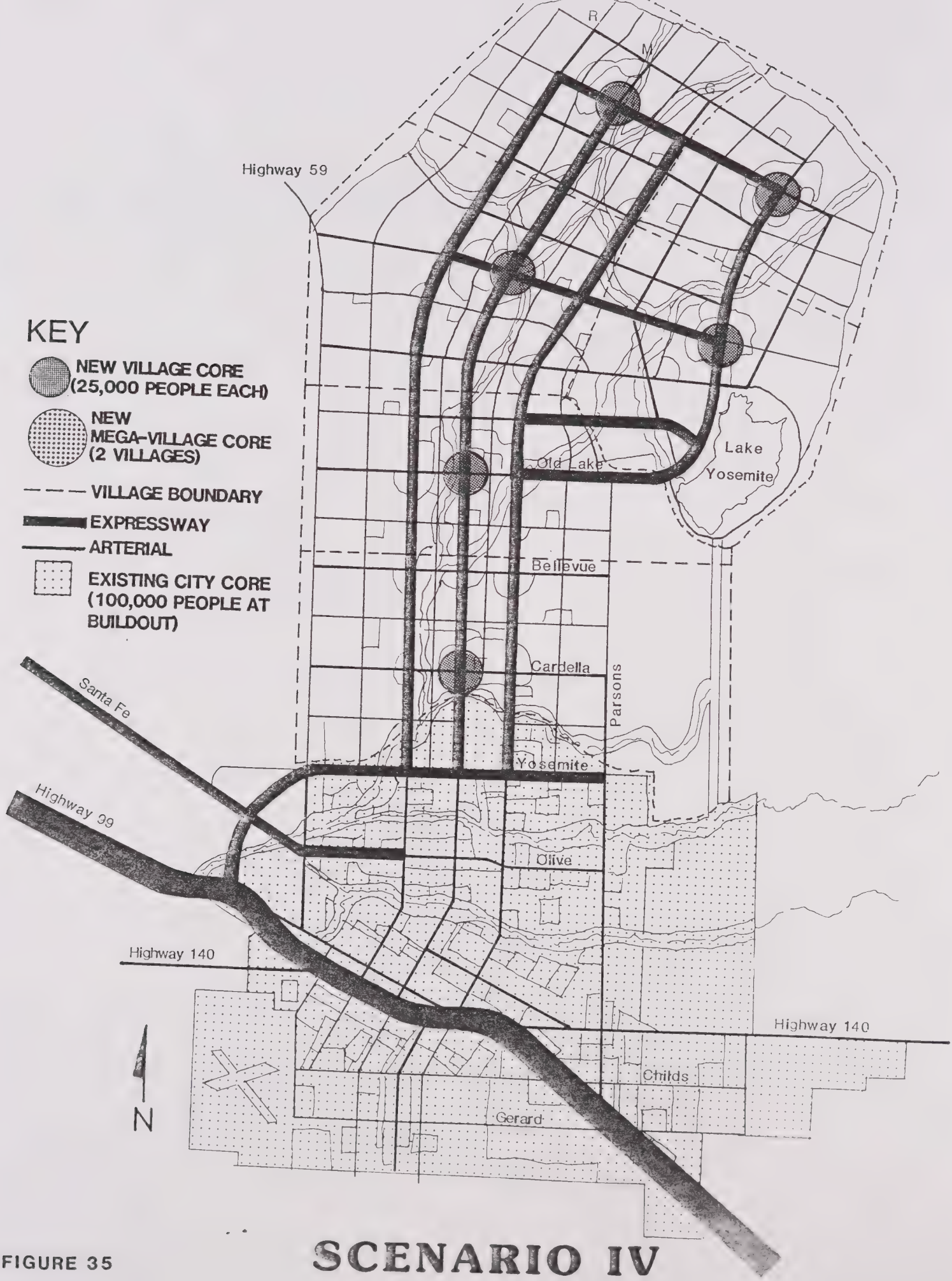
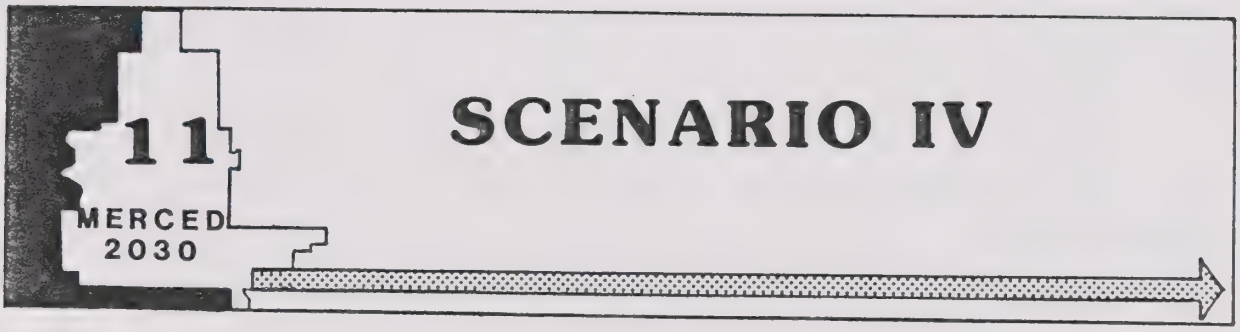


FIGURE 35

SCENARIO IV



SCENARIO IV

DYNAMICS

Growth Scenario IV assumes a northward growth pattern with villages west and north of Lake Yosemite. Four villages form a square pattern as shown opposite. This Scenario is possible because growth constraints, such as the Castle Air Force Base flight path and agricultural soils to the east and west, are not present north of the lake.

1. Geography/Land Use

   Four of the villages are aligned northward and connected by the "G", "M", and "R" Street expressways. The two villages north of Lake Yosemite are connected to other villages by two east/west expressways and Old Lake Road. This Scenario utilizes some hills for development.

2. Sewer

   Sewer mains for this Scenario extend up Highway 59 and branch over to serve the villages north of Lake Yosemite. This is the second least expensive sewer system to build.

3. Water

   Water mains are generally 16 inches on a one-mile grid with 12 inch mains at half-mile points. The water distribution system of this Scenario is the second most expensive to implement. The higher cost can be attributed to the greater amount of pipe needed to connect the northern villages.

4. Circulation

   Circulation for Scenario IV utilizes "G", "M", and "R" Street expressways which flank slightly eastward as they extend north. An expressway on Parsons Avenue and Old Lake Road extends northward to serve and connect the two villages north of Lake Yosemite with Central Merced. Traffic improvement costs are the second least-costly of the four Scenarios even though more new streets have to be built instead of using more existing streets, thus avoiding exposing existing areas to much greater traffic volumes.

5. Bridges and Signals

   Bridge costs for Scenario IV are the second highest of all the Scanarios. Bridge costs are higher because of the need to cross creeks and streams north of Lake Yosemite.

The number of signals necessary to implement Scenario IV is 193. This is approximately 0.77 signals/1000 people, which approximates the density of Modesto.

ADVANTAGES

The following advantages to growth in this direction include:

1. Growth is outside the Castle Air Force Base flight path.

2. The development is not built on prime agricultural soils.

3. This Scenario utilizes the attractive development potential of the hills and lake.

4. This Scenario avoids flood-prone areas to the south, east, and west.

5. This is overall the second least-costly Scenario in terms of providing public facilities.

6. Travel between villages for residents is relatively efficient and convenient. The heavy reliance on new streets for this Scenario will lessen the impacts on existing streets and residents of increased traffic volumes.

7. This Scenario would retain the existing County rural residential centers east of the current SUDP.

DISADVANTAGES

The following disadvantages to growth in this direction include:

1. This Scenario creates two concentrations of growth of approximately 100,000 people, which may be undesirable. One is west and north of Lake Yosemite, while the other is the present core of Merced.

2. Traffic congestion in the four northern villages could occur due to the spreading effect of the northern villages and the grid-like street layout.

3. Lake Yosemite's character could be changed and impact the existing County facilities at the lake.

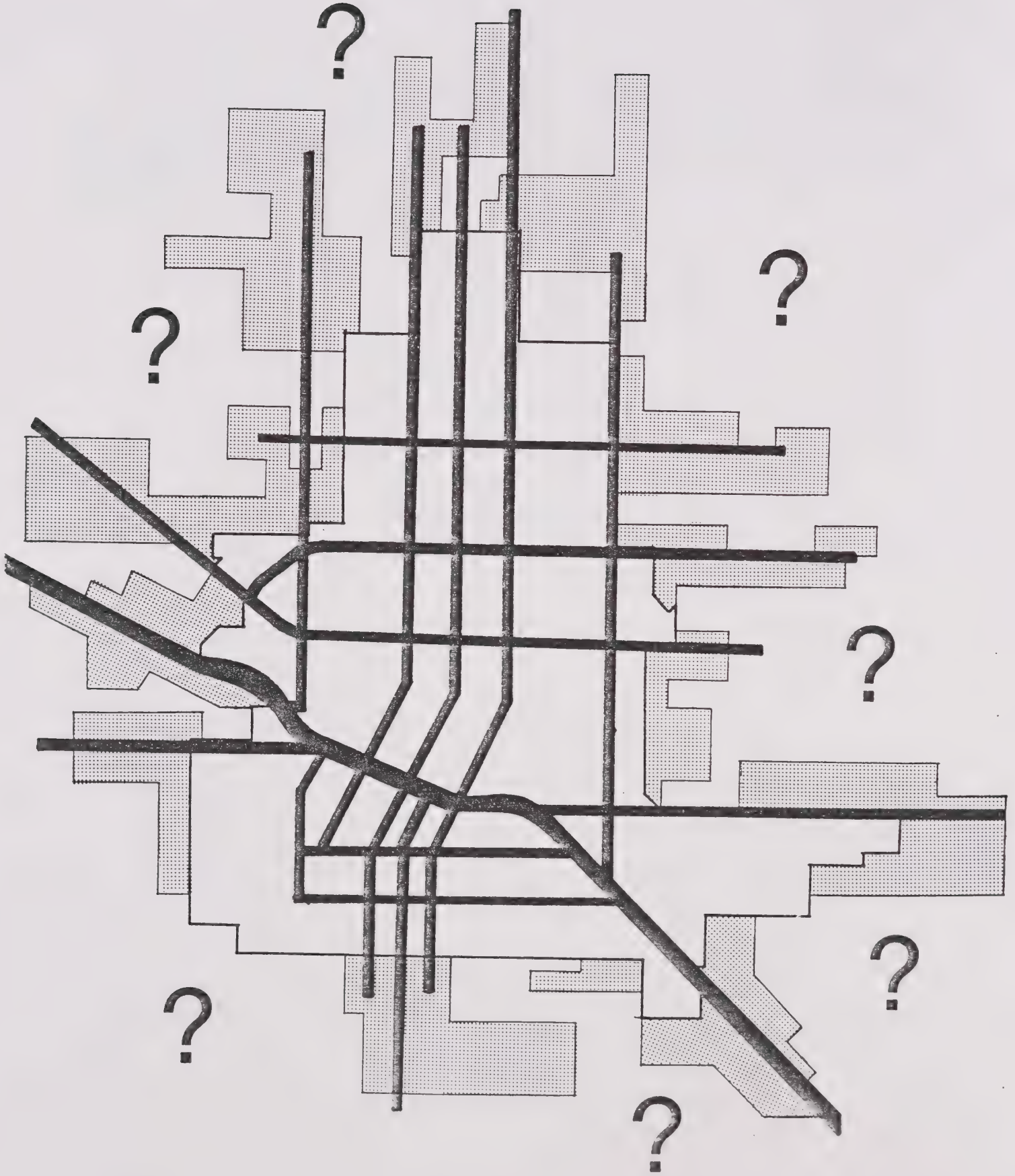
4. Holding east-west boundaries in the lower area could be difficult.

5. Northern growth is not convenient to Highway 99.

6. Downtown is less centralized to the northernmost villages, but the expressways should save overall travel time even if the travel distance is greater.

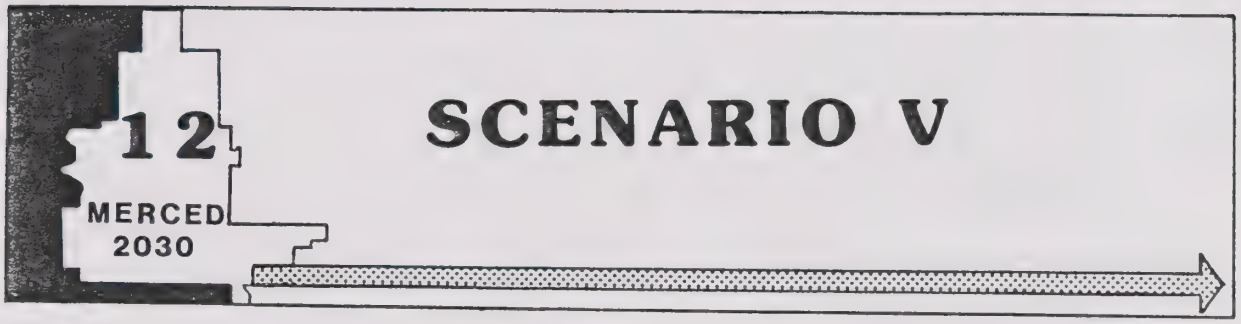
SUMMARY

Scenario IV utilizes the hills around Lake Yosemite, avoids environmentally-sensitive areas, and provides public facilities efficiently and inexpensively, but would create a distinct central area in the north away from Highway 99 and downtown.



SCENARIO V

FIGURE 36



SCENARIO V

DYNAMICS

Scenario V is the option that would be selected by default if none of the Scenarios (or variations of one Scenario) is selected.

1. Geography/Land Use

   The physical limits and land uses of this Scenario, with 250,000 people cannot be depicted as indicated on the page opposite. Developer pressure, constraints and the given political climate will dictate how the City will expand. The SUDP will undoubtedly be changed incrementally by agreement with Merced County.

2. Sewer System

   The sewer system will rely on line extensions with each new development proposal. The City can create appropriate sewer assessment districts. The least costly extension of sewer service would occur only by accident, since the actual design would be based on the direction and rate of growth.

3. Water

   Water would be distributed with a proper distribution grid to be built as development occurs. Water sources would include well water and possibly surface water from the Merced River as needed. Because wells can generally be located when and where growth occurs, there would likely not be a significant cost difference between this and other Growth Scenarios if development is generally projected at least 10 years into the future to allow proper planning of water system interconnections.

4. Circulation

   Streets would be extended and constructed by the developer with appropriate right-of-way dedications. The City can designate street types (i.e., expressways, arterials, etc.) on the General Plan to try to provide for adequate circulation, but it would be best to assume that all circulation associated with each of the other Scenarios is provided for here in order to have good circulation no matter which way the City grows. This would necessitate major right-of-way acquisition costs.

5. Bridges and Signals

   Public improvements and modifications would need to be provided by the City to accommodate increases in traffic to include the addition/modification of signals at intersections. Such modifications after developers

have completed their projects could lead to major costs, if absorbed by the City. Bridge construction and modification can also be very costly to the City if changes must be made in later years should growth in a particular unexpected direction make previously-built bridges inadequate. Without a definite growth plan, the City is much less able to plan for the size and location of public improvements necessary due to increased traffic congestion. If the City utilized a definite growth plan, overall development costs would be reduced and the costs would be better distributed between the City and developers.

ADVANTAGES

An advantage of this Scenario is that it might be more readily acceptable to some involved in the development community, because it allows for considerable flexibility in where future development can locate.

DISADVANTAGES

The following disadvantages were noted with this Scenario:

1. The City is much less able to plan for public projects.

2. Traffic congestion could be severe due to haphazard street patterns.

3. Long-term costs to the City, developers, and taxpayers would be much higher.

4. The City would likely become just another "sprawling city".

5. Residents would likely lose their sense of place and experience a lower quality of life than with planned growth.

SUMMARY

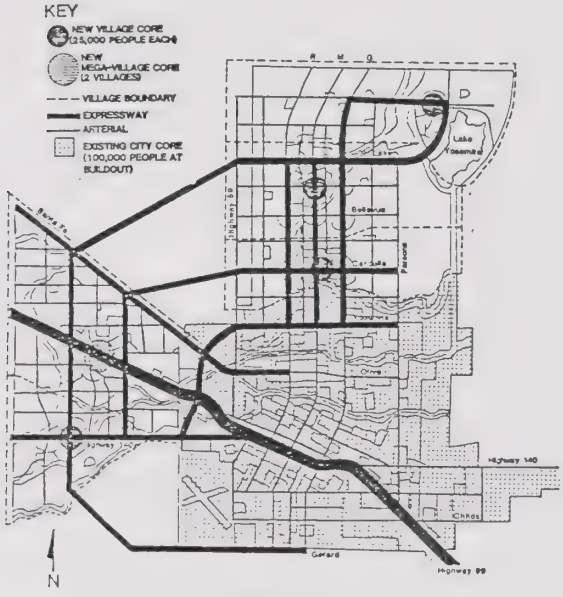
Scenario V has no real advantages. It will likely lead to more traffic congestion, less liveability, and higher costs for public services. It is to the City's advantage to plan for long-term growth by using one of the previous four Scenarios rather than becoming just another unpleasant, sprawling City.

13 MERCED 2030

SELECTION OF A GROWTH SCENARIO

SUMMARY

After considering the Village Concept, the five possible Scenarios, and related information contained in this study, it is time to select the preferred Growth Scenario. Each of the five Growth Scenarios are summarized below and in chart form in Figure 37.



SCENARIO I

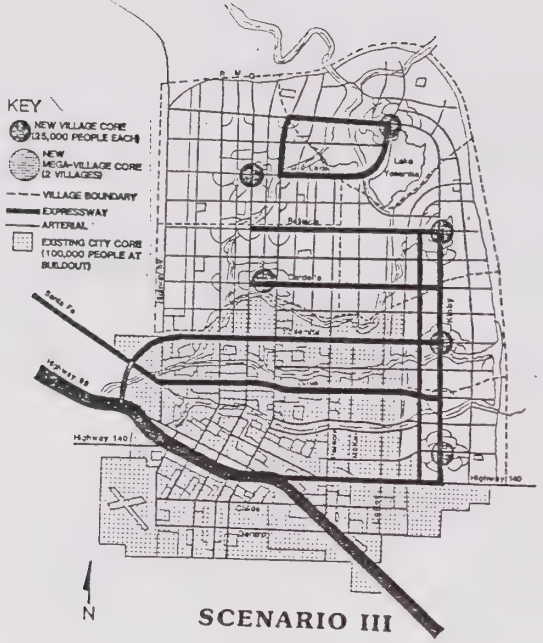
Scenario I - "Western City"

Scenario I is reasonable in terms of livability and access to downtown, but is less efficient in regards to traffic circulation and the overall cost of providing the necessary public improvements and services. This Scenario also intrudes on some of the environmentally-sensitive areas such as western agricultural land and flood-prone areas.

SCENARIO II

Scenario II - "Linear City"

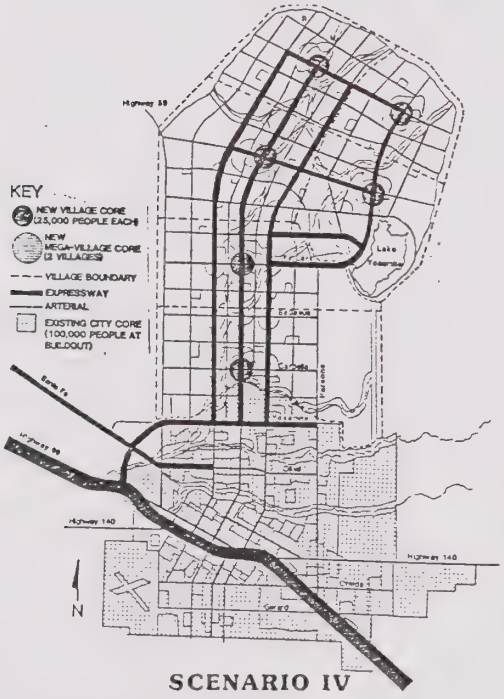
Scenario II's advantages include a high degree of livability, a simple, well-defined, efficient circulation system (e.g., the "G", "M" and "R" Street expressways), low cost of service delivery and a close proximity to open space adjacent to each of the villages; but Scenario II's extreme northern growth is inconvenient to Highway 99 and holding its east/west boundaries may be difficult.



SCENARIO III

Scenario III - "Eastern City"

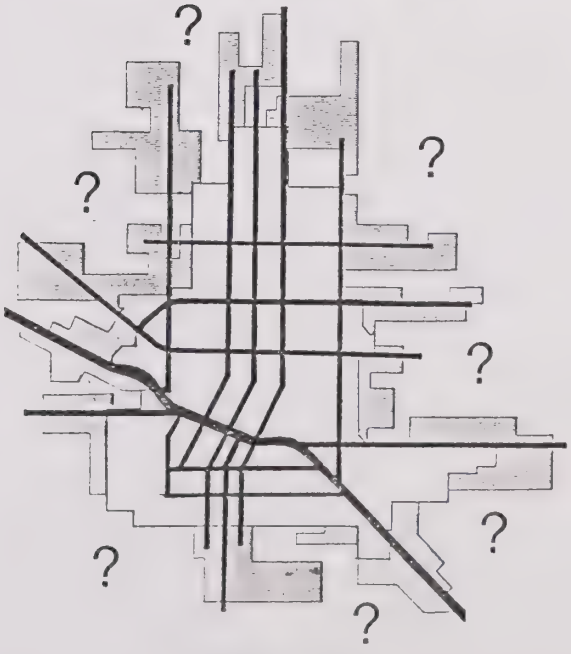
Scenario III has easy access to Highway 99 and the City's heavy industrial area, but the typical urban sprawl of this Scenario would result in the loss of prime agricultural land and heavy traffic impacts, and would be very costly to implement.



SCENARIO IV

Scenario IV - "Northern City"

Scenario IV utilizes the hills around Lake Yosemite, avoids environmentally-sensitive areas, and provides public facilities efficiently and inexpensively, but would create a distinct central area in the north away from Highway 99 and downtown.



SCENARIO V

Scenario V - "Do Nothing"

Scenario V has no real advantages. It will likely lead to more traffic congestion, less liveability, and higher costs for public services. It is to the City's advantage to plan for long-term growth by using one of the previous four Scenarios rather than becoming just another unpleasant, sprawling City.

FIGURE 37

GROWTH SCENARIOS COMPARISON CHART

	LIVEABILITY	SERVICES AND FACILITY PROVISION	COST	ENVIRONMENTAL CONSTRAINTS	CIRCULATION
SCENARIO I "WESTERN CITY"	- Downtown Centrally Located - Freeway Commercial Sprawl - Close to Atwater and Highway 99	-Least-Costly Sewer Due to Proximity to Sewer Plant -Second Least-Costly Water	Total-$712.7 Million HIGHEST	-Encroaches on City Airport Clear Zone -Built on Agricultural Land to West	-More Crosstown Trips Through Downtown Needed -Uses Many Existing East/West Streets -Most-Costly
SCENARIO II "LINEAR CITY"	-Northern Hills Setting -Adjacent to More Open Space -Easy Public Transit	-Least-Costly Water -Second Most-Costly Sewer Because of Distance from Sewer Plant	Total-$555.3 Million LOWEST	-Avoids All Environmentally-Sensitive Areas	-G, M, and R Street Expressways -Least Signals -Least-Costly
SCENARIO III "EASTERN CITY"	-Lake Yosemite Setting -Urban Sprawl -Easy Access to Highway 99	-Most-Costly Sewer and Water Because Largest Area to Serve	Total-$679.0 Million SECOND-HIGHEST	-Built on Prime Agricultural Land to East	-Grid System -Heavy Impact on Existing East/West Streets -Congestion Likely -Second Most-Costly
SCENARIO IV "NORTHERN CITY"	-Lake Yosemite and Northern Hills Setting -Northern Core Area Away From Downtown	-Second Most-Costly Water Due to Large Area Away From Existing Facilities -Second Least-Costly Sewer	Total-$615.8 Million SECOND-LOWEST	-Avoids All Environmentally-Sensitive Areas	-G, M, and R Street Expressways -Uses Many New Streets -Second Least-Costly
SCENARIO V "DO NOTHING"	-Urban Sprawl -No Sense of Place	-Can Be Provided But Probably Not Efficiently or at the Least Cost	?	-Could Avoid Sensitive Areas If Current City Policies Are Followed	-Traffic Congestion -Haphazard Street Patterns

SELECTION CRITERIA

In order to select a preferred Growth Scenario, it is helpful to consider the following criteria used to evaluate the Scenarios in Figure 37.

Livability, provision of public services, cost, environmental constraints, and circulation efficiency should be studied in each Growth Scenario before determining which Scenario would be the most desirable growth pattern.

1. Liveability. Liveability within a city should take into consideration psychological, social, and physical factors. Residents should feel secure, part of a neighborhood unit and enjoy opportunities for interaction and recreation. Daily family routines such as travel to work, schools, and shopping should be convenient to each citizen. Great cities are memorable because they are designed with people in mind. They take advantage of view potential, from roadways and housing and work areas. They use natural topographic features. Unique architecture, the presence of focal points (such as Courthouse Square in Merced) and natural amenities (i.e., open space, parks, waterways, and trees) are highlights. If properly executed, any of the Growth Scenarios could provide a well designed living environment.

2. Services and Facility Provision. The selected Growth Scenario should provide a high level of easily accessible public facilities and services to residents, with ease of provision on the part of the City. The chosen Scenario should minimize the amount of public street extensions, sewer lines, and water lines. Long-term construction and maintenance costs should be minimized. However, liveability concerns may outweigh maximum efficiency of service provision. Ease of providing police and fire service is also important.

3. Cost. The City must consider the cost of implementation and maintenance. These costs should not exceed the anticipated revenue from new development. If they do, the City may be faced with expensive public facility projects it cannot afford, and thus be unable to realize the full potential of liveability, design and service availability inherent in the chosen Growth Scenario.

4. Environmental Constraints. Each Growth Scenario should be evaluated on how environmental constraints (Castle Air Force Base flight path, flood plains, prime agricultural land--discussed at length in Section No. 3) have been taken into account and how well the areas identified as undesirable for development have been avoided.

5. Efficient Circulation. Each Growth Scenario should make it easy for residents to get from place to place within the City. Sufficient right-of-way widths and a traffic circulation system, which keeps major street intersections to a minimum, need to be maintained to avoid traffic congestion.

CITIZEN PARTICIPATION

The participation of a wide cross-section of citizens, organizations and public agencies in the Growth Study review process is important in reaching the best designs. It also will help provide a solid support base for carrying out the policies established and for the public/private partnerships that will be necessary to carry out the policies. This study raises issues for Merced County as well. It is important that its citizens also participate in this planning process.

GROWTH PLAN AND IMPLEMENTATION

This document is not a new General Plan for the City. This City of Merced Growth Study, or "How Should We Grow?", is the first phase of a two-phase planning process. After the Planning Commission and City Council decide on the Village Concept and select a Growth Scenario, the staff will prepare a draft Phase II Growth Plan that provides further necessary details about the Growth Scenario selected and proposed implementation measures. These measures may include City General Plan changes and SUDP (Specific Urban Development Plan) boundary changes, which will need to be negotiated with Merced County.

NEED FOR COOPERATION

The City needs the cooperation of Merced County if the Growth Study adopted policies are to be carried out. The City's Growth Study will only become fully effective if the County agrees with it. Plans of both the City and County must be coordinated in order to preserve agricultural land, rural residential centers, and future urban expansion areas.

Housing, employment, transportation, public services, and annexation problems will not be resolved without considerable cooperation. Whether within the City limits or on Merced's fringe, the County's land use decisions will support or undermine City planning efforts.

Coordination and cooperation with other agencies such as the school districts, Merced College, the Merced County Association of Governments, and Merced Irrigation District are also important.

Although complex, selecting the desired Growth Scenario and deciding whether to adopt the Village Concept is the easy part. Whatever is decided will be continuously tested by those wishing to develop in areas designated as permanent agricultural land, wanting driveway cuts on expressways, and proposing shopping centers at major expressway intersections outside of designated village core areas. Ultimately, it comes down to civic will and City/County cooperation. Without it, the adopted policies will become hollow dreams and Merced will become just another sprawling city that does not function well or provide a good environment in which to live or invest.

EPILOGUE

In the year 2030 when Merced citizens look back at this 1990 Growth Study, will they regret the decisions made regarding the Village Concept or the Growth Scenario selected? What ideas will have been rejected as economically or politically impractical? That 40 years of hindsight will suggest what could have been accomplished with more vision and will.

The City of Merced Growth Study has been designed in an attempt to avoid these future regrets. It is important that we raise our sights regarding what is possible as we plan for the next 40 years and a population of 250,000 people.

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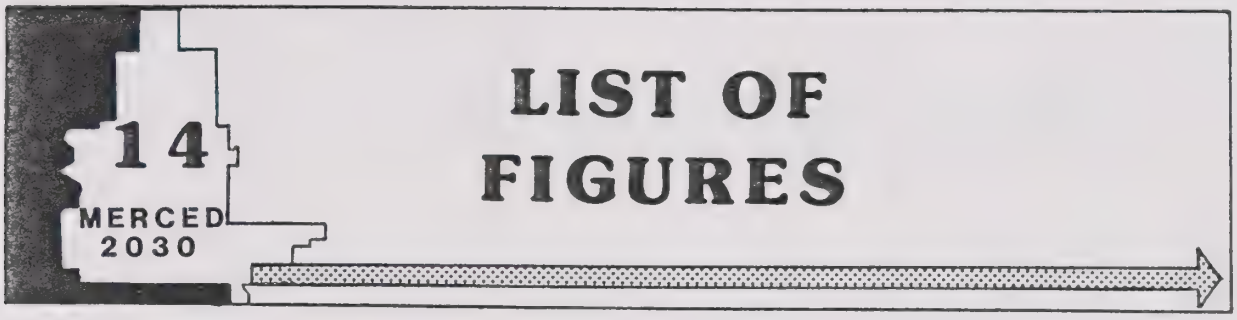
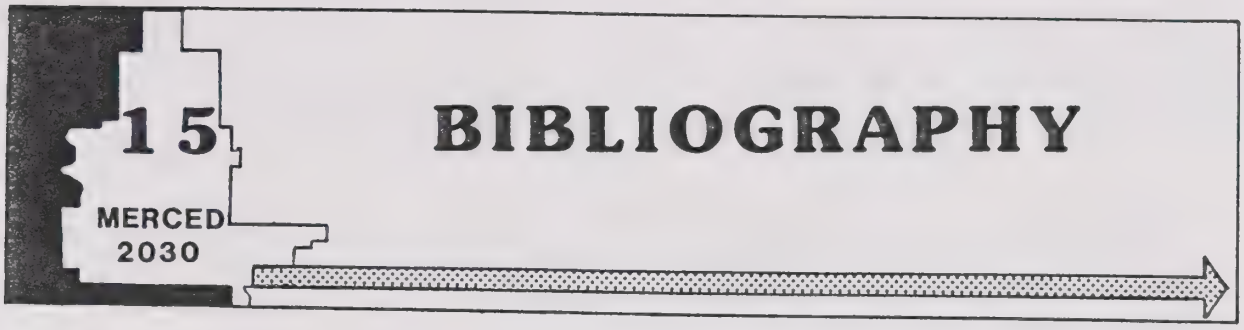


LIST OF FIGURES

(Unless otherwise noted, illustrations are courtesy of the City of Merced Community Development Department.)



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MERCED 2030

APPENDICES

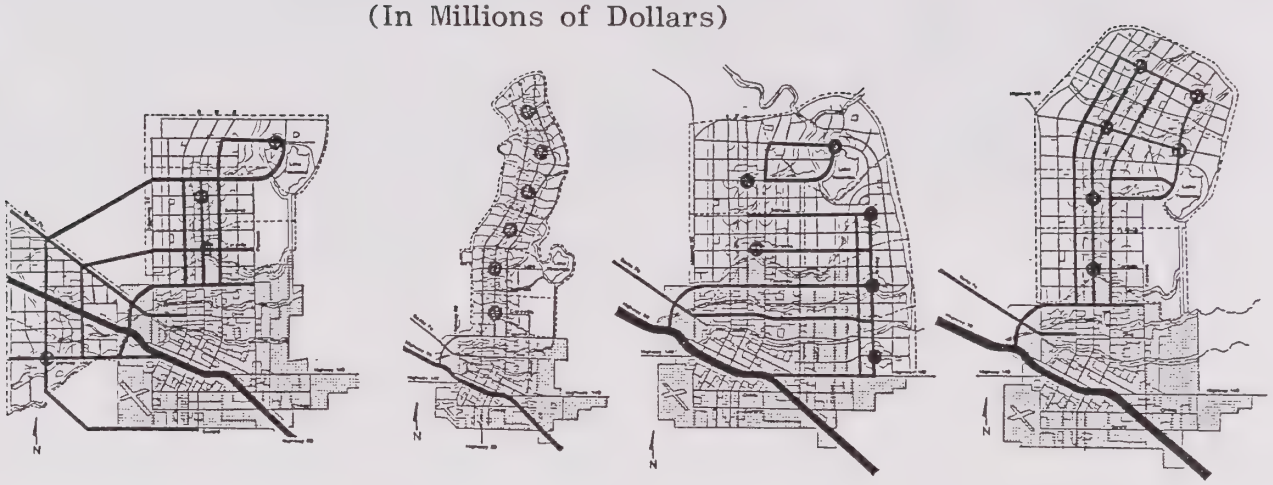
A. COST SUMMARY

B. SIGNAL COMPARISON

APPENDIX A

COST SUMMARY

(In Millions of Dollars)



	Scenario I	Scenario II	Scenario III	Scenario IV
Sewer	$ 73.1	$ 75.5	$ 78.8	$ 74.4
Water	119.0	116.8	130.8	126.7
Circulation (Without Flyovers)	338.3	342.7	337.8	364.1
Flyovers	182.3	20.3	131.6	50.6
Total	$712.7	$555.3	$679.0	$615.8

Note: All figures are in 1990 dollars.

Sewer costs include collection and expansion of existing type of treatment plant.

Water includes existing well spacing (one-mile) and 16" main grid supported by 10" and 12" mains. An additional 10 million gallons of storage is included.

Circulation costs shown are for one-mile crossing spacing on expressways. If access points are added at half-mile points, the costs would be significantly higher. (Expressways would require 10 through-lanes instead of six through-lanes, and per signal costs would be much more as a result.

Each scenario appears to provide a traffic/circulation system that is deficient in roughly the same degree, although the geographic areas in which the deficiencies occur varies between scenarios. The addition of expressway interchanges, or flyovers at various locations, substantially increases street capacity and, therefore, improves the Level of Service. The number of flyovers to accomplish this varies between scenarios, and that cost is reflected above.

More detailed information on the miles of streets (expressways, arterials, etc.), numbers of wells, and amount of sewer and water lines can be found in the Merced 2030 - How Should We Grow? Technical Appendices.

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APPENDIX B

SIGNAL COMPARISON

Each of the four Growth Scenarios shows the likely placement of signals based on expected traffic volumes. (Actual numbers may vary due to changes in technology and unexpected traffic patterns.) The following chart compares the number of signals needed and the number of signals per 1,000 population. Modesto and Fresno figures are added for comparison. Following the comparison chart are the signal location maps for Fresno and Modesto.

	Population	#Traffic Signals	Signals Per 1,000 People
Fresno	400,000	404	1.01
Modesto	167,000	148	.89
Merced (Present)	55,000	41	.75
Growth Scenario I	250,000	189	.76
Growth Scenario II	250,000	138	.55
Growth Scenario III	250,000	210	.84
Growth Scenario IV	250,000	193	.77

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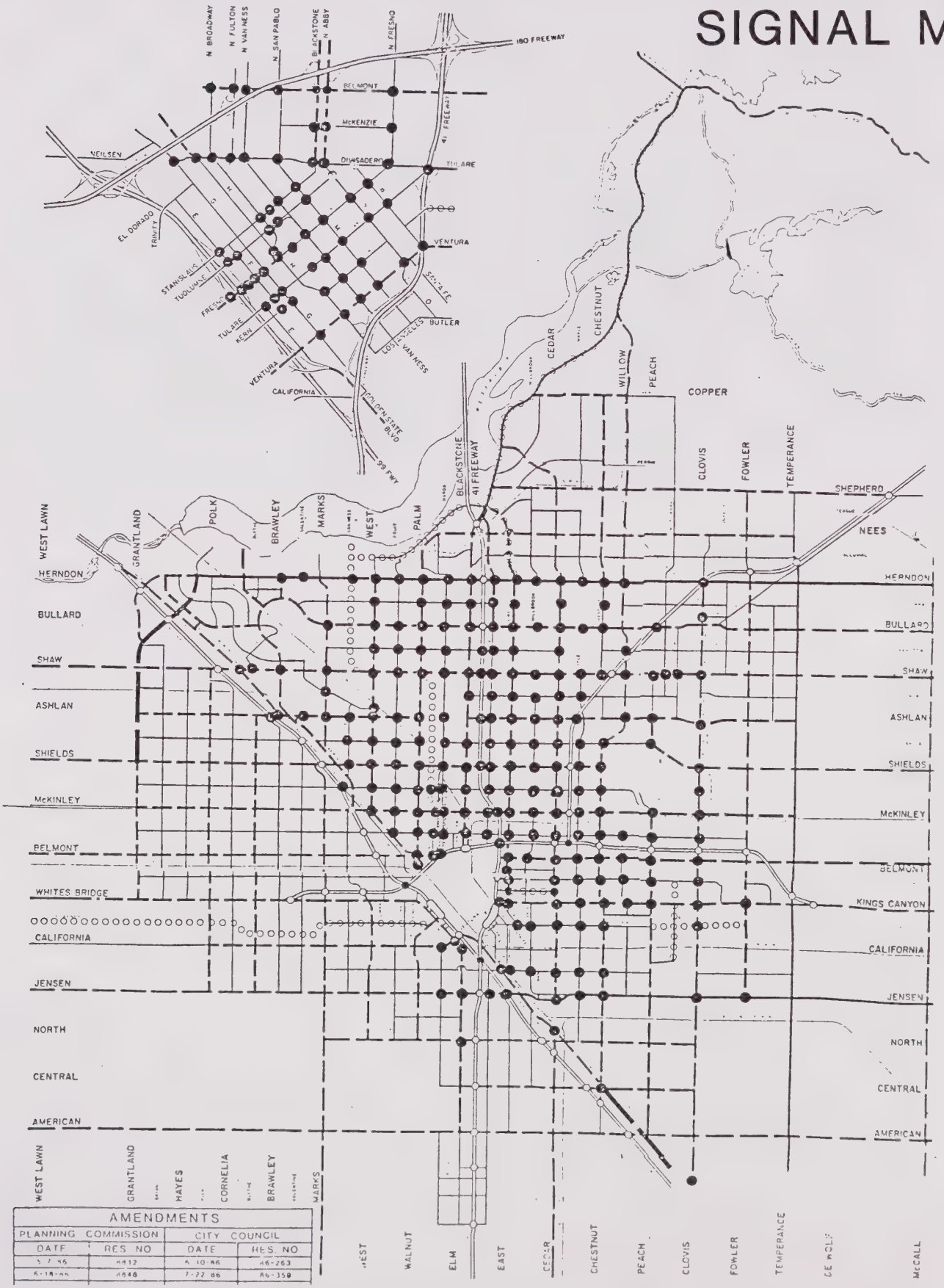
FRESNO'S TRAFFIC FLOW AND SIGNAL MAP



AMENDMENTS			
PLANNING COMMISSION		CITY COUNCIL	
DATE	RES. NO.	DATE	RES. NO.
5-7-86	8912	5-10-86	86-263
6-18-86	8948	7-22-86	86-359

FRESNO - CLOVIS METROPOLITAN AREA

1984 FRESNO GENERAL PLAN CIRCULATION ELEMENT

FREEWAY
EXPRESSWAY
SUPER ARTERIAL
SCENIC DRIVE
ARTERIAL
COLLECTOR
SIGNALS

N

NOVEMBER 1984

404 TOTAL SIGNALS

MODESTO TRAFFIC FLOW AND SIGNAL MAP
1988